

Biodiversity Conservation Prioritisation Project (BCPP) India  
Endangered Species Project

Conservation Assessment and Management Plan  
(C.A.M.P.) Workshop

# REPORT

1998

**Authored by the participants**

**Edited by B.A. Daniel, Sanjay Molur and Sally Walker**

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**Selected Soil Invertebrates  
of Southern India**

**Hosted by the Zoological Survey of India, Southern Regional Station, Chennai**

**Chennai 24 -28 February, 1997**

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**Report of BCPP CAMP on  
selected soil invertebrates of southern India**

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**Report of BCPP CAMP workshop for  
selected soil invertebrates of southern India**

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**Biodiversity Conservation Prioritisation Project (BCPP) India  
Conservation Assessment and Management Plan (C.A.M.P.) Workshops for  
Selected Soil Invertebrates of Southern India**

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Medicinal Plants of N., N.E. & Central India  
Soil Invertebrates of Southern India  
Amphibians of India  
Indian Reptiles of India  
Indian Mangrove Ecosystem  
Mammals of India  
Indian Freshwater fishes

**Biodiversity Conservation Prioritisation Project (BCPP) India  
Conservation Assessment and Management Plan (C.A.M.P.) Workshops for  
Selected Soil Invertebrates of Southern India**

**Hosts, Coordinators, Organisers, Collaborators**

**Host**

Zoological Survey of India, Southern Regional Station, Chennai

**Coordinators / Facilitators**

World Wide Fund for Nature, India, Coordinator  
Salim Ali Centre for Ornithology and Natural History, Coordinator  
Zoo Outreach Organisation/  
Conservation Breeding Specialist Group, India, Organiser / Facilitators

**Collaborating institution**

Forest Department of Tamil Nadu

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# **Selected Soil Invertebrates of Southern India**

## **Executive Summary**

**Biodiversity Conservation Prioritisation Project, India -- Endangered Species Project  
Conservation Assessment and Management Plan (C.A.M.P.) Workshops**

**Selected Soil Invertebrates of Southern India  
Hosted by Zoological Survey of India, Southern Regional Station  
Chennai, 24 – 28 February 1997**

**EXECUTIVE SUMMARY**

**Introduction**

The Biodiversity Conservation Prioritisation Project, India undertook a prioritisation exercise for species, sites and strategies for conservation. The Endangered Species Subgroup selected the Conservation Assessment and Management Plan Workshop Process and the IUCN Red List Criteria (Revised, 1994) for assessing conservation status of species at a planning workshop held as part of the Project.

A Conservation Assessment and Management Plan (C.A.M.P.) Workshop was conducted for selected Soil Invertebrates of Southern India to assess their status in the wild. The Workshop took place from 24 – 28 February 1997 in Chennai, hosted by the Zoological Survey of India, Southern Regional Station. Other local collaborators were the Wildlife Division, Forest Department of Tamil Nadu, and World Wide Fund for Nature, Chennai as well as facilitating and coordinating organisations Zoo Outreach Organisation, Conservation Breeding Specialist Group, India, Invertebrate Special Interest Group and Salim Ali Centre for Ornithology and Natural History. Forty-six participants from 36 institutes with expertise ranging from field biology to forest management attended the workshop. A total of 95 taxa of soil invertebrates were assessed in the 5-day workshop. The selection of species for assessment within certain pre-decided groups was left to the discretion of the participants on the basis of their expertise, following a discussion and consensus by the participants.

The expertise available at the workshop included reputed field biologists with years of field study in various areas as well as those currently conducting studies. Participants worked in 4 working groups for 5 days and assessed 95 taxa. Information for every taxa was entered on "Taxon Data Sheets" in which details of each taxon such as distribution, population numbers, habitat structure, threats affecting the taxa, population decline and the quality of data provided for the taxa are given here. This information was used to assess the status of the taxon and assign a category of threat according to the IUCN Red List categories. Taxon specific recommendations were also made after categorisation for use in conservation action planning.

**CAMP methodology**

The Conservation Assessment and Management Plan process is a methodology for rapid assessment of taxa in the wild. This methodology is a rational and objective method of assigning threat categories and deriving recommendations for conservation action plans through participatory group inputs from many stakeholders. A CAMP process is a platform for a congregation of 10 to 40 experts from related fields such as field biologists, ecologists, habitat experts, wildlife managers, forest officials, captive managers, university researchers, academicians, non-governmental organisations, policy makers and other relevant stakeholders. The CAMP Workshop is organised and conducted by objective facilitators who while having interest and concern do not have a professional or personal stake in the outcome of the assessments.

The conservation assessment is also followed by research and conservation recommendations for every taxon. CAMP workshops provide a rational and comprehensive means of assessing priorities for intensive management within the context of the broader conservation needs of threatened taxa.

The Conservation Breeding Specialist Group, SSC, IUCN developed the CAMP process methodology first for identifying priorities in captive management planning for the global zoo community, which needed to know the *in situ* conservation status of species in their care. The methodology, however, has proved so effective for assessing status in the wild that it has been recognised by IUCN SSC Specialist Groups, governmental and non-governmental agencies, conservation action planners and policy makers all over the world. The CAMP workshop philosophy and methodology is emerging as an effective means of conducting biodiversity inventory, identification and monitoring, thus satisfying Agenda Item 7 in the Convention on Biological Diversity.

**Results**

Ninety-five taxa of soil invertebrates were assessed at the workshop of which 16 are Critically Endangered, 21 Endangered, 24 Vulnerable, 20 Lower Risk near threatened, 9 Lower Risk least concern, 4 Data Deficient and 1

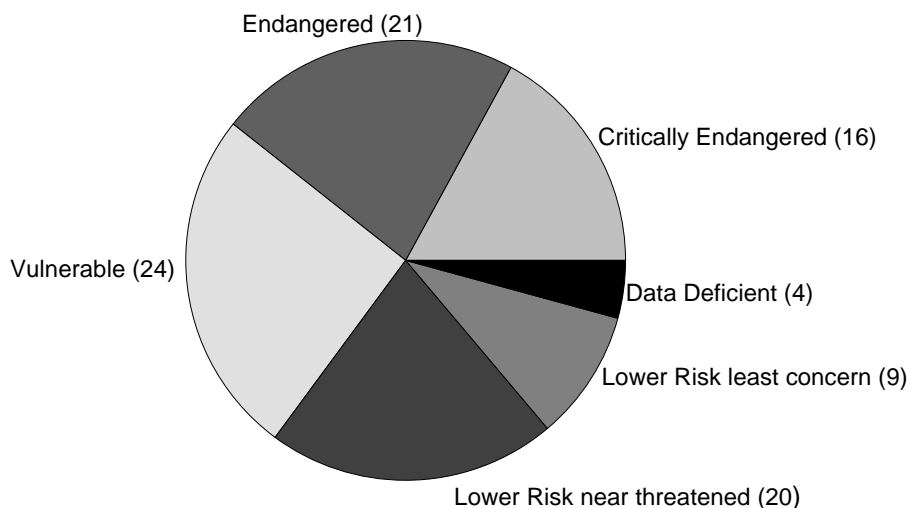
as Not Evaluated. The high percentage of threatened species (64%) in this list may not reflect the actual situation for all invertebrates in India because these 95 represent better studied invertebrates which also may have been selected for assessment due to concern for their conservation in the first instant. There are more than 72,000 species of invertebrates in India. The sample assessment does, however, give a warning of a trend towards threatened status that some invertebrates are facing in the wild in India. Threats to invertebrates are similar to threats that most fauna and flora face today – loss of habitat, fragmentation and interference all due to human needs that result in shrinking of wild habitats. Invertebrates that occupy specialised niches in the wild are facing a high risk of extinction due to rapid changes occurring in quality of habitat.

The factors that are used in a categorisation of threat are 1. Population reduction; 2. Restricted distribution; 3. Population size; 4. Number of mature individuals or population restriction and 5. Probability of extinction. The degree of threat depending on each or any of these five criteria determines the threat category. Of the threatened invertebrates, most are assessed so because of restricted distribution (91%) while only a few are due to population reduction (19%). Assessments were restricted to southern India and nearly 50% of the taxa assessed were southern Indian endemics. This being the case, most of the endemics have a restricted distribution which makes them qualify for that criteria for threat.

In addition to the 95 taxa, rapid assessment was done for 5 groups of soil invertebrates where in nearly 600 taxa were prioritised for their conservation and research importance. Specific questions such as the date of discovery, number of studies conducted after discovery, endemism, study conducted in the last 10 years, and the state of the habitat in which the taxa occur were all scored to give a research prioritisation rating. According to that rating of the 276 species of molluscs, 264 are rated as high priority, 27 of 39 millipedes, 85 of 99 species of termites, and 25 species of 93 grass hoppers as high priority. Of the 91 ants assessed, not enough information was available to prioritise research.

Recommendations for future conservation action were proposed for every taxon of the 94 assessed. Of the threatened taxa, 67 were recommended for intensive surveys, 39 for monitoring, 34 for habitat management, 36 for life history studies, 14 for limited factor research, 7 each for taxonomic studies and population and habitat viability assessments, 4 for limiting factor management and 7 for various taxon specific recommendations. Survey was considered very important because information on complete distribution of taxa is lacking. Monitoring and habitat management were considered important because of constant human interference causing changes in population structure of invertebrates and also changes in quality of habitat in the wild.

### Status of selected soil invertebrates



As part of the workshop, special working groups were formed to discuss issues related to assessing and conserving invertebrates. Three groups, Systematics and population studies on invertebrates, Education and awareness, and Logistics of conserving invertebrates were formed and relevant recommendations made. Working groups reports are given in full in the body of the main report. At the end of the workshop, all participants were asked to make commitments to invertebrate conservation in their personal capacity, which is also included at the end of the main report.

**Table 1. Alphabetical list of Soil Invertebrate taxa assessed at the BCPP CAMP, Chennai**

Species	Class / Order	IUCN	Criteria
1. <i>Acanthaspis alagiriensis</i>	Insecta / Hemiptera	CR	(B1, 2c)
2. <i>Acanthaspis carinata</i>	Insecta / Hemiptera	CR	(B1, 2c)
3. <i>Acanthaspis minutum</i>	Insecta / Hemiptera	VU	(D2)
4. <i>Acanthaspis nigripes</i>	Insecta / Hemiptera	VU	(D2)
5. <i>Acanthaspis pedestris</i>	Insecta / Hemiptera	LR-nt	
6. <i>Acanthaspis siruvani</i>	Insecta / Hemiptera	VU	(D2)
7. <i>Alstonitermes flavescens</i>	Insecta / Isoptera	EN	(A1ac; B1, 2abc)
8. <i>Amblyopone bellii</i>	Insecta / Hymenoptera	DD	
9. <i>Aularchis miliaris</i>	Insecta / Orthoptera	LR-nt	
10. <i>Bellamyia bengalensis</i>	Pelecypoda / Megagastropoda	LR-nt	
11. <i>Bellamyia dissimilis</i>	Pelecypoda / Megagastropoda	LR-nt	
12. <i>Bithynia stenothyroides</i>	Pelecypoda / Megagastropoda	VU	(B1, 2ac)
13. <i>Chondromorpha kelaarki</i>	Myriapoda / Polydesmida	LR-lc	
14. <i>Corbicula regularis</i>	Pelecypoda / Eulamellibranchiata	DD	
15. <i>Crematogaster rogenhoferi</i>	Insecta / Hymenoptera	LR-lc	
16. <i>Cypris dravidensis</i>	Oristacca / Podocopida	EN	(B1, 2c)
17. <i>Cypris protuberata</i>	Oristacca / Podocopida	EN	(B1, 2ac)
18. <i>Cypris subglobosa</i>	Oristacca / Podocopida	LR-nt	
19. <i>Dichogaster curgensis</i>	Oligochaeta / Lumbricina	LR-lc	
20. <i>Drawida nilamburensis</i>	Oligochaeta / Moniligastreda	CR	(B1, 2abc)
21. <i>Ectrychotes bharathi</i>	Insecta / Hemiptera	CR	(B1, 2c)
22. <i>Edocia punctatum</i>	Insecta / Hemiptera	CR	(B1, 2c)
23. <i>Edocia heberii</i>	Insecta / Hemiptera	CR	(B1, 2c)
24. <i>Edocia maculatus</i>	Insecta / Hemiptera	EN	(B1, 2c)
25. <i>Eucoptacrella ceylonica</i>	Insecta / Orthoptera	CR	(B1, 2abc)
26. <i>Eucypris bispinosa</i>	Oristacca / Podocopida	CR	(B1, 2ac)
27. <i>Gyraulus convexiusculus</i>	Pelecypoda / Basommatophora	VU	(B1, 2ac)
28. <i>Gyraulus saigonensis</i>	Pelecypoda / Basommatophora	LR-nt	
29. <i>Haematorrhophus fovealis</i>	Insecta / Hemiptera	CR	(B1, 2c)
30. <i>Haematorrhophus ruguloscutellaris</i>	Insecta / Hemiptera	VU	(D2)
31. <i>Hemihematorrhophus planidorsatus</i>	Insecta / Hemiptera	EN	(B1, 2c)
32. <i>Heterometrus barberi</i>	Arachnida / Scorpiones	EN	(B1, 2c)
33. <i>Heterometrus keralensis</i>	Arachnida / Scorpiones	EN	(B1, 2c)
34. <i>Heterometrus malapuramensis</i>	Arachnida / Scorpiones	VU	(A1c; B1, 2ac)
35. <i>Heterometrus swammerdami</i>	Arachnida / Scorpiones	VU	(A1ac)
36. <i>Ilyocypris spinifer</i>	Oristacca / Cladocera	LR-nt	
37. <i>Indoplanorbis exustus</i>	Pelecypoda / Basommatophora	LR-nt	
38. <i>Isometrus brachycentrus</i>	Arachnida / Scorpiones	VU	(B1, 2ac)
39. <i>Lamellidens marginalis</i>	Pelecypoda / Eulamethibranchia	LR-nt	
40. <i>Lychas tricarinatus</i>	Arachnida / Scorpiones	LR-lc	
41. <i>Lymnaea acuminata</i>	Pelecypoda / Basommatophora	NE	
42. <i>Lymnaea luteola</i>	Pelecypoda / Basommatophora	LR-nt	
43. <i>Macrotermes estherae</i>	Insecta / Isoptera	EN	(B1, 2abcd)
44. <i>Macrothrix laticornis</i>	Oristacca / Cladocera	LR-nt	
45. <i>Melania scabra</i>	Pelecypoda / Megagastropoda	VU	(A1c)
46. <i>Melania tuberculata</i>	Pelecypoda / Megagastropoda	VU	(A1c)
47. <i>Meranoplus bellii</i>	Insecta / Hymenoptera	DD	
48. <i>Mesacanthaspis kovaiensis</i>	Insecta / Hemiptera	CR	(B1, 2c)
49. <i>Mesobuthus hendersoni</i>	Oligochaeta / Lumbricina	LR-lc	
50. <i>Microcerotermes fletcheri</i>	Insecta / Isoptera	VU	(A1ac; B1, 2abc)
51. <i>Mysorella costigera</i>	Pelecypoda / Megagastropoda	LR-nt	
52. <i>Nasutitermes indicola</i>	Insecta / Isoptera	VU	(A1ac; B1, 2ac)
53. <i>Ocnerodrilus occidentalis</i>	Arachnida / Scorpiones	EN	(B1, 2c)
54. <i>Octochaetona serrata</i>	Oligochaeta / Lumbricina	VU	(B1, 2ce)
55. <i>Octonochaeta rosea</i>	Oligochaeta / Lumbricina	Lr-nt	(B1, 2c)
56. <i>Ocypoda ceratophthalma</i>	Oristacca / Decapoda	LR-nt	
57. <i>Ocypoda cordimana</i>	Oristacca / Decapoda	EN	(B1, 2ac)
58. <i>Ocypoda macrocera</i>	Oristacca / Decapoda	EN	(B1, 2bc)

Species	Class / Order	IUCN	Criteria
59. <i>Ocypoda platytarsis</i>	Oristacca / Decapoda	VU	(A1c)
60. <i>Odontotermes brunneus</i>	Insecta / Isoptera	VU	(A1ac; B1, 2ac)
61. <i>Odontotermes wallonensis</i>	Insecta / Isoptera	VU	(B1, 2c)
62. <i>Oecophylla smaragdina</i>	Insecta / Hymenoptera	LR-lc	
63. <i>Paludomus monile</i>	Pelecypoda / Megagastropoda	EN	(B1, 2b)
64. <i>Paludomus stomatodon</i>	Pelecypoda / Megagastropoda	CR	(B1, 2b)
65. <i>Paludomus tanschaurica</i>	Pelecypoda / Megagastropoda	VU	(A1c)
66. <i>Parreysia corrugata</i>	Pelecypoda / Eulamelibranchiata	VU	(B1, 2ac)
67. <i>Perionyx excavatus</i>	Oligochaeta / Lumbricina	LR-nt	
68. <i>Phyllogonostreptus nigrolabiatus</i>	Myriapoda / Spirostreptida	LR-nt	
69. <i>Pila globosa</i>	Pelecypoda / Megagastropoda	VU	(A1c)
70. <i>Pila virens</i>	Pelecypoda / Megagastropoda	VU	(B1, 2ac)
71. <i>Plagirolepis jerdonii</i>	Insecta / Hymenoptera	LR-lc	
72. <i>Poeciloceris pictus</i>	Insecta / Orthoptera	LR-lc	
73. <i>Polydrepanum tamilum</i>	Myriapoda / Polydesmida	LR-nt	
74. <i>Psilacrum convexa</i>	Insecta / Diptera	CR	(B1, 2abc)
75. <i>Sechelleptus importatus</i>	Myriapoda / Spirostreptida	CR	(B1, 2c)
76. <i>Speculitermes singalensis</i>	Insecta / Isoptera	EN	(B1, 2c)
77. <i>Strandesia bicornuta</i>	Oristacca / Podocopida	EN	(B1, 2a)
78. <i>Strandesia elongata</i>	Oristacca / Podocopida	EN	(B1, 2a)
79. <i>Strandesia flavescens</i>	Oristacca / Podocopida	EN	(B1, 2a)
80. <i>Strandesia indica</i>	Oristacca / Podocopida	VU	(B1, 2ac)
81. <i>Strandesia labiata</i>	Oristacca / Podocopida	LR-nt	
82. <i>Strandesia purpurascens</i>	Oristacca / Podocopida	EN	(B1, 2ac)
83. <i>Streptogonopus jerdoni</i>	Myriapoda / Polydesmida	EN	(B1, 2c)
84. <i>Sulcospira hugeli</i>	Pelecypoda / Megagastropoda	EN	(B1, 2ac)
85. <i>Synectrychotes calimerei</i>	Insecta / Hemiptera	CR	(B1, 2c)
86. <i>Tetramorium rossi</i>	Insecta / Hymenoptera	DD	
87. <i>Tetraponera aitkeni</i>	Insecta / Hymenoptera	LR-lc	
88. <i>Thelyphonus sepiaris</i>	Arachnida / Uropygi	LR-nt	
89. <i>Tricimbomyia muzhiyarensis</i>	Insecta / Diptera	CR	(B1, 2c)
90. <i>Trinervitermes biformis</i>	Insecta / Isoptera	VU	(A1ac; B1, 2c)
91. <i>Truxalis indica</i>	Insecta / Orthoptera	EN	(B1, 2c)
92. <i>Velitra neelai</i>	Insecta / Hemiptera	DD	
93. <i>Viviparus variata</i>	Pelecypoda / Megagastropoda	EN	(B1, 2bc)
94. <i>Xenobolus acuticonus</i>	Myriapoda / Spirobolida	LR-nt	
95. <i>Zarytes squalina</i>	Insecta / Orthoptera	CR	(B1, 2ab)

## IUCN Red List Categories and Criteria explained in brief below

### \* IUCN Red List *Categories* :

**CR – Critically endangered** -- a taxon is Critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future as defined by the criteria.

**EN – Endangered** -- a taxon is Endangered when it is not Critically endangered but is facing a very high risk of extinction in the wild in the near future as defined by the criteria.

**VU – Vulnerable** -- a taxon is Vulnerable when it is not Critically endangered or Endangered but is facing a high risk of extinction in the wild in the medium term future as defined by the criteria.

**LR – Lower risk** – a taxon is Low Risk when it has been evaluated and does not qualify for any of the threatened categories, Critically endangered, Endangered, Vulnerable, or Data Deficient. (LR-nt – near threatened, LR-lc – least concern, LR-cd – conservation dependent).

**DD – Data deficient** – A taxon is Data Deficient when there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.

**NE – Not evaluated** – A taxon is Not Evaluated when it has not yet been assessed against the criteria.

### \*\* IUCN Red List *Criteria*

**A – Population reduction** – (1) observed, inferred, suspected or estimated reduction, or (2) projected or predicted reduction of at least 20% (VU), or 50% (EN), or 80% (CR) in 10 years or 3 generations whichever is longer based on (a) Direct observation; (b) index of abundance appropriate for the taxon; (c) decline in areas of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; (e) effects of introduced taxa, hybridisation, pathogens, pollutants, competitors, or parasites.

**B – Restricted distribution** -- Extent of occurrence estimated to be less than 20,000 sq km. (VU), or 5,000 sq km (EN) or 100 sq km (CR) and/or area of occupancy estimated to be less than 2000 sq.km. (VU), or 500 sq km (EN), or 10 sq km (CR), and qualifying for any two of the following : (1) severely fragmented, or known to exist in not more than 10 locations (VU), or 5 locations (EN), or single location (CR); (2) continuing decline, observed, inferred, projected in any (a) extent of occurrence, (b) area of occupancy; (c) area, extent and/or quality of habitat; (d) number of locations or subpopulations; (e) number of mature individuals; (3) extreme fluctuation in either (a) extent of occurrence, (b) area of occupancy, (c) number of populations or subpopulations, (d) number of mature individuals.

**C – Population estimates** – population estimated to number less than 10,000 (VU), or 2,500 (EN), or 250 (CR) mature individuals and either (1) estimated, continuing decline of at least 10% in 10 years or 3 generations or whichever is longer (VU), or 20% in 5 years or 2 generations, whichever is longer (EN), or 25% in 3 years or 1 generation whichever is longer (CR) OR in (2) continuing decline, observed, projected, inferred, number of mature individuals and population structure in the form of either (a) severely fragmented [no subpopulation estimated to contain more than 1000 (VU), or 250 (EN), or 50 (CR) mature individuals]; (b) all individuals are in a single subpopulation.

**D – Restricted populations** – (1) Population estimated to number less than 1000 (VU), or 250 (EN), or 50 (CR) mature individuals; (2) Population restricted in area of occupancy of less than 100 sq km or less than 5 locations (VU).

**E – Probability of extinction** – quantitative analysis showing the probability of extinction in the wild is at least 10% in 100 years (VU), or 20% in 20 years or 5 generations, whichever is longer (EN), or 50% in 10 years or 3 generations, whichever is longer (CR).

**Summary Data Tables for Selected Species of Northern, Northeastern and Central Indian Medicinal Plants are on the following pages. Below is a Key to the symbols used in the tables :**

**No. of Location :** F = Fragmented

**Range:** A = < 100 sq.km.; B = < 5,000 sq.km.; C = < 20,000 sq.km.; D = > 20,000 sq.km.;

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**Data Quality:** 1 = Reliable census or population monitoring; 2 = General field studies; 3 = Informal field sightings; 4 = Indirect information; 5 = Museum/ herbarium/ collection/ records; 6 = Hearsay/ popular belief

**Threat:** L = Loss of habitat; Lf = Loss of habitat due to fragmentation; D = Diseases; Dp = Decline in prey species; E = Edaphic factors (changes in); H = Harvest; Hf = Harvest for food; Hm = Harvest for medicine; I = Human interference; P = Predation; Ps = Pesticides; Sf = Fire as catastrophic event; T = Trade; Tp = Trade of parts

**Research Recommendations:** G = Genetic management; H = Husbandry research; Hm = Habitat management; Lh = Life history studies; Lm = Limiting factor management; Lr = Limiting factor research; M = Monitoring; O = Other (specific to the species); P = PHVA; PP = PHVA pending further work; S = Survey search and find; T = Taxonomic and morphological genetic studies; TI = Translocations

**Cultivation Recommendations :** 1 = Cultivation for conservation either only in situ and ex situ with the population maintaining 90% genetic diversity for 100 years; = same as 1 but periodic reinforcement of cultivations with genetic materials from the wild; 3 = Cultivation only for research, education or husbandry but not for conservation; P = pending

**Level of difficulty:** 1 = Least difficult; 2 = Moderately difficult; 3 = Very difficult

## IUCN Red List Categories and Criteria explained in brief below

### \* IUCN Red List *Categories* :

**CR – Critically endangered** -- a taxon is Critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future as defined by the criteria.

**EN – Endangered** -- a taxon is Endangered when it is not Critically endangered but is facing a very high risk of extinction in the wild in the near future as defined by the criteria.

**VU – Vulnerable** -- a taxon is Vulnerable when it is not Critically endangered or Endangered but is facing a high risk of extinction in the wild in the medium term future as defined by the criteria.

**LR – Lower risk** – a taxon is Low Risk when it has been evaluated and does not qualify for any of the threatened categories, Critically endangered, Endangered, Vulnerable, or Data Deficient. (LR-nt – near threatened, LR-lc – least concern, LR-cd – conservation dependent.

**DD – Data deficient** – A taxon is Data Deficient when there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.

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## **Selected Soil Invertebrates of Southern India**

### **Summary Data Table**



Summary Data Table for Selected Soil Invertebrates of Southern India

Species	Habit	Range	Area	No. Of Loc/ F	% Decline	Year/ gen.	Pop. No.	Data quality	Threats	IUCN	Crit .	Research recom.	Capt. breed	Lev. diff.
<i>Acanthaspis alagiriensis</i> Insecta / Hemiptera	Underneath stones	A	A	1	Unk	Unk	Unk	1	I	CR	RD	S, Lh, M	3	Unk
<i>Acanthaspis carinata</i> Insecta / Hemiptera	Underneath stones	A	A	1	Unk	Unk	Unk	2	I, L	CR	RD	S, Lh, Hm	No	No
<i>Acanthaspis minutum</i> Insecta / Hemiptera	Underneath stones	A	A	1	Unk	Unk	Unk	2	Unk	VU	RP	S, Lh	No	No
<i>Acanthaspis nigripes</i> Insecta / Hemiptera	Under boulders	A	A	1	Unk	Unk	Unk	2	L, I	VU	RP	S, Lh	3	Unk
<i>Acanthaspis pedestris</i> Insecta / Hemiptera	Under stones, Entomophagous	D	D	>20	20	20 yrs	Unk	1, 2, 3	L, I, Dp	LR-nt	—	Hm	No	1
<i>Acanthaspis siruvani</i> Insecta / Hemiptera	Predators on ants and termites	A	A	1	Unk	Unk	Unk	2	No	VU	RP	S, Lh, M	No	No
<i>Alstonitermes flavescens</i> Insecta / Isoptera	Detritus leaf litter	B	B	2 -3, F	50	10 yrs	Unk	2, 4	Ps, L	EN	PR; RD	S, M, Hm, Lr, P	1	3
<i>Amblyopone belli</i> Insecta / Hymenoptera	Unk	D	A	1	Unk	Unk	Unk	3	Unk	DD	—	S, M, Lh, Lr, PP	3	Unk
<i>Aularchis miliaris</i> Insecta / Orthoptera	Phytophagous	D	D	Many	Unk	Unk	Unk	3, 4	Ps	LR-nt	—	Lh	No	Unk
<i>Bellamyia bengalensis</i> Pelecypoda / Megagastropoda	Shallow water- Benthic	D	D	Many	10	10 yrs	Unk	2, 5	L, Pu, Ps	LR-nt	—	S	No	1
<i>Bellamyia dissimilis</i> Pelecypoda / Megagastropoda	Shallow Benthic water	D	D	9, F	10	10 yrs	Unk	2, 3	L, Pu, Ps	LR-nt	—	S, O	No	1
<i>Bithynia stenothyroides</i> Pelecypoda / Megagastropoda	Phytophagous littoral	D	C	5, F	15	10 yrs	Unk	2	L, Pu, Ps	VU	RD	S	No	2
<i>Chondromorpha kelaarki</i> Myriapoda / Polydesmida	Decomposed litter feeder	D	D	Many	No	Unk	Unk	2	L, C, Sd	LR-lc	—	S, T	No	1
<i>Corbicula regularis</i> Pelecypoda / Eulamellibranchiata	Filter feeder	B	C	1	15	10 yrs	Unk	5	Unk	DD	—	S	No	2
<i>Crematogaster rogenhoferi</i> Insecta / Hymenoptera	Carnivorous, phyto- phagous	D	D	Many	Stable	Unk	Unk	2	No	LR-lc	—	S, M, Hm, Lh, PP	3	1
<i>Cypris dravidensis</i> Oristacca / Podocopida	Benthic, lentic	D	B	4, F	10	10 yrs	Unk	2	L, Pu, I	EN	RD	Hm	No	1
<i>Cypris protubera</i> Oristacca / Podocopida	Littoral, Benthic	B	B	2	10	10 yrs	Unk	2	L, Pu, I	EN	RD	Hm	No	1
<i>Cypris subglobosa</i> Oristacca / Podocopida	Benthi, Lentic	D	D	10, F	10	10 yrs	Unk	2	L, Pu, I	LR-nt	—	Hm	1	1
<i>Dichogaster curgensis</i> Oligochaeta / Lumbricina	Detritivorous	D	D	Many	No	Unk	Unk	2	E, Ps, Sd	LR-lc	—	M, Lm, PP	3	1
<i>Drawida nilamburensis</i> Oligochaeta / Moniligastrida	Geophagous (Soil eating)	A	A	1	20	10 yrs	Unk	3	L, I	CR	RD	M, Hm, Lr, S, P	P	Unk

Species	Habit	Range	Area	No. Of Loc/ F	% Decline	Year/ gen.	Pop. No.	Data quality	Threats	IUCN	Crit.	Research recom.	Capt. breed	Lev. diff.
<i>Ectrychotes bharathi</i> Insecta/ Hemiptera	Underneath stones	A	A	1	Unk	Unk	Unk	2	I, L	CR	RD	S, Lh	No	No
<i>Edocia punctatum</i> Insecta / Hemiptera	Under stones	A	A	1	Unk	Unk	Unk	2	I	CR	RD	S, Lh	No	No
<i>Edocla heberii</i> Insecta / Hemiptera	Under stones	A	A	1	Unk	Unk	Unk	2	Gr, I	CR	RD	S, M, Lh	3	Unk
<i>Edocla maculatus</i> Insecta / Hemiptera	Underneath stones	D	B	3	Unk	Unk	Unk	2	I	EN	RD	S, Lh	No	No
<i>Eucoptacrella ceylonica</i> Insecta / Orthoptera	Phytophagous	B	A	2, F	10-20	10 yrs	Unk	2	L,I	CR	RD	S, M, Lr, Lh, P	3	1
<i>Eucypris bispinosa</i> Oristacca / Podocopida	Littoral, Benthic	A	A	1	10	10 yrs	Unk	2	L, Pu, I	CR	RD	Hm	No	1
<i>Gyraulus convexiusculus</i> Pelecypoda / Basommatophora	Phytophagous	C	C	Many, F	10	10 yrs	Unk	2	L, Pu, Ps	VU	RD	Hm	No	1
<i>Gyraulus saigonensis</i> Pelecypoda / Basommatophora	Littoral, Benthic	D	D	3, F	10	10 yrs	-	2	L, Ps, Pu	LR-nt	—	S	No	2
<i>Haematorrhophus fovealis</i> Insecta / Hemiptera	Under stone	A	A	1	Unk	Unk	Unk	2	I	CR	RD	S, M, Lh	No	Unk
<i>Haematorrhophus ruguloscutellaris</i> Insecta / Hemiptera	Under boulders	A	A	1	Unk	Unk	Unk	2	Unk	VU	RP	S, Lh, M	3	Unk
<i>Hemihaematorrhophus planidorsatus</i> Insecta / Hemiptera	Under stones	C	B	4, F	Unk	Unk	Unk	2	L, I, Gr	EN	RD	S, Lh, M	No	Unk
<i>Heterometrus barberi</i> Arachnida / Scorpiones	Nocturnal	B	C	1	Unk	-	NK	2, 3	I, L	EN	RD	T, S, M, Lh, PP	P	Unk
<i>Heterometrus keralensis</i> Arachnida / Scorpiones	Nocturnal	B	B	1	10	10 yrs	Unk	2	I, L	EN	RD	T, S, M, Lr, Hm, Lh, PP	3	3
<i>Heterometrus malapuramensis</i> Arachnida / Scorpiones	Nocturnal carnivorous	C	C	5, F	20	10 yrs	Unk	2, 3	L	VU	PR; RD	S, M, Lh, Lr, PP	P	Unk
<i>Heterometrus swammerdami</i> Arachnida / Scorpiones	Nocturnal, carnivora	D	D	Many	20	10 yrs	Unk	2, 3	L, I, Sd, E	VU	PR	S, Hm, P	1	1
<i>Ilyocryptus spinifer</i> Oristacca / Cladocera	Littoral, Benthic	D	D	1	10	10 yrs	Unk	2	L, Pu, Ps	LR-nt	—	S	No	1
<i>Indoplanorbis exustus</i> Pelecypoda / Basommatophora	Lentic freshwater	D	D	Many	10	10 yrs	-	2	L, Pu, Ps	LR-nt	—	S	No	1
<i>Isometrus brachycentrus</i> Arachnida / Scorpiones	Nocturnal	C	C	3	10	10 yrs	Unk	2	I, L	VU	RD	T, S, M, Lh, PP	P	Unk
<i>Lamellidens marginalis</i>	Benthic Filter feeder	D	D	Many	15	10 yrs	Unk	2	L, H	LR-nt	—	S	No	1

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Pelecypoda / Eulamellibranchiata														
<i>Lychas tricarinatus</i> Arachnida / Scorpiones	Nocturnal	D	D	Many	No	Unk	Unk	2	I, L	LR-lc	—	M, O	No	1
<i>Lymnaea acuminata</i> Pelecypoda / Basommatophora	Attach to floating algae	D	D	Many, F	10	10 yrs	Unk	2	L, Pu, Ps	NE	—	S	No	1
<i>Lymnaea luteola</i> Pelecypoda / Basommatophora	Attached to aquatic vegetation	D	D	Many	10	10 yrs	Unk	2	L, Pu, Ps	LR-nt	—	S, M	No	1
<i>Macrotermes estherae</i> Insecta/ Isoptera	Dry grass and leaf litter	B	B	Many, F	30	10 yrs	Unk	2	L, E	EN	RD	S, M, Hm, Lr, PP	No	Unk
<i>Macrothrix laticornis</i> Oristacca / Cladocera	Littoral, Benthic	D	D	3	10	10 yrs	Unk	2	L, Pu, Ps	LR-nt	—	M	No	1
<i>Melania scabra</i> Pelecypoda / Megagastropoda	Attached to hard substances	D	D	Many	20	10 yrs	Unk	2, 4	L, Pu, Ps	VU	PR	M	No	1
<i>Melania tuberculata</i> Pelecypoda / Megagastropoda	Attached to hard substratum	D	D	Many	20	10 yrs	Unk	2, 4	L, Pu	VU	PR	M	No	1
<i>Meranoplus bellii</i> Insecta / Hymenoptera	Nectar feeders	B	B	5	Unk	Unk	Unk	2	Unk	DD	—	S, M, Lh, PP	No	Unk
<i>Mesacanthaspis kovaiensis</i> Insecta / Hemiptera	Under stone	A	A	2, F	Unk	Unk	Unk	2	L, Gr, I	CR	RD	S, Lh	No	Unk
<i>Mesobuthus hendersoni</i> Oligochaeta / Lumbricina	Nocturnal	D	D	Many	No	Unk	Unk	2	L, I	LR-lc	—	O, PP	No	Unk
<i>Microcerotermes fletcheri</i> Insecta / Isoptera	Leaf litter & Tree bark feeder	D	C	Many, F	30	10 yrs	Unk	2	L, I	VU	PR; RD	S, M, Lm, Lh, Hm, PP	3	3
<i>Mysorella costigera</i> Pelecypoda / Megagastropoda	Littoral, Benthic	D	D	Many	10	10 yrs	Unk	2, 4	L, Pu, Ps	LR-nt	—	S	No	2
<i>Nasutitermes indicola</i> Insecta / Isoptera	Leaf litter and bark feeder	C	C	Many, F	> 20	10 yrs	Unk	2	L	VU	PR; RD	S, M, Hm, PP	No	Unk
<i>Ocnerodrilus occidentalis</i> Arachnida / Scorpiones	Detritus feeder	D	B	2	No	Unk	Unk	2, 3	L, Sd	EN	RD	S, M, T, Hm, O, PP	No	Unk
<i>Octochaetona serrata</i> Oligochaeta / Lumbricina	Geophytrophagous subsurface feeder	C	C	Many, F	5	10 yrs	Unk	1	I, L, Sd, E	VU	RD	S, M, Hm	3	1
<i>Octonochaeta rosea</i> Oligochaeta / Lumbricina	Geophagous	D	D	Many	No	Unk	Unk	1, 3	E, I, Ps, Sd	LR-nt	RD	S, M, Hm, Lr, PP	P	2
<i>Ocypoda ceratophthalma</i> Oristacca / Decapoda	Burrowing	D	D	Many	10	10 yrs	Unk	2, 4	L, Pu, I	LR-nt	—	S	No	3
<i>Ocypoda cordimana</i> Oristacca / Decapoda	Burrowing	B	C	1	20	10 yrs	Unk	2, 4	Pu, I, L	EN	RD	S, Hm	No	3
<i>Ocypoda macrocera</i> Oristacca / Decapoda	Burrowing	B	C	Many, F	20	10 yrs	Unk	2, 4	Pu, I, L	EN	RD	S	No	3
<i>Ocypoda platytarsis</i>	Burrowing	D	C	Unk	20	10 yrs	Unk	2, 4	Pu, I, L, Hf	VU	PR	S, Hm, O	No	1

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<i>Oristacca</i> / Decapoda														
<i>Odontotermes brunneus</i> Insecta / Isoptera	Litter feeder	C	C	Many, F	20	10 yrs	Unk	2	L, I	VU	PR; RD	S, M, Hm, PP	No	Unk
<i>Odontotermes wallonensis</i> Insecta / Isoptera	Soil inhabiting and subterranean	D	C	Many, F	Unk	-	Unk	2	L, E, Ps, Lf	VU	RD	S, M	3	3
<i>Oecophylla smaragdina</i> Insecta / Hymenoptera	Carnivorous, honey dew & sap feeder	D	D	Many	Unk	-	Unk	2	Hf	LR-lc	—	Hm	No	Unk
<i>Paludomus monile</i> Pelecypoda / Megagastropoda	Littoral, Benthic, on hard substances	B	C	3	20	10 yrs	Unk	2, 4	L, Pu	EN	RD	S, Hm, Lh	No	1
<i>Paludomus stomatodon</i> Pelecypoda / Megagastropoda	Littoral, Benthic, on hard substances	A	A	1	20	10 yrs	Unk	2	L, I	CR	RD	S, Hm, Lr	P	Unk
<i>Paludomus tanschaurica</i> Pelecypoda / Megagastropoda	Littoral, Benthic	D	D	4, F	20	10 yrs	Unk	2, 4	L, Pu	VU	PR	S, Lh	No	1
<i>Parreysia corrugata</i> Pelecypoda/ Eulamellibranchiata	Benthic, Filter feeder	C	D	Many, F	15	10 yrs	Unk	2, 4	Pu, Ps, L	VU	RD	S	No	2
<i>Perionyx excavatus</i> Oligochaeta / Lumbricina	Detritus feeder	D	D	Many	No	Unk	Unk	1, 3	E, L	LR-nt	—	S, M, Lr, O	3	1
<i>Phyllogonostreptus nigrolabiatus</i> Myriapoda / Spirostreptida	Soil and litter feeder	D	D	Many	Unk	Unk	Unk	2	L, Sd	LR-nt	—	T, S, Lh, M	P	2
<i>Pila globosa</i> Pelecypoda / Megagastropoda	Field and algal mass	D	D	Many	90	30 yrs	Unk	2, 4	L, Ps, Pu, I, Hf, Hm	VU	PR	S, O	No	1
<i>Pila virens</i> Pelecypoda / Megagastropoda	Fields and stagnant Water	D	C	5	90	30 yrs	Unk	2, 4	L, Ps, Pu, I	VU	RD PR	S	No	1
<i>Plagiolepis jerdonii</i> Insecta / Hymenoptera	Aphicolous, subterranean	D	D	Many	No	-	Unk	2	No	LR-lc	—	S, M, Lh	3	1
<i>Poeciloceris pictus</i> Insecta / Orthoptera	Phytophagous	D	D	Many	No	-	Unk	4	I	LR-lc	—	Lr	No	1
<i>Polydrepanum tamilum</i> Myriapoda / Polydesmida	Litter feeding	D	D	Many	Unk	Unk	Unk	2, 3	C, L, Sd	LR-nt	—	S, M	No	1
<i>Psilacrum convexa</i> Insecta / Diptera	On leaves of shrubs	A	A	1	Unk	Unk	Unk	1	L	CR	RD	S, Lh, PP	No	Unk
<i>Sechelleptus importatus</i> Myriapoda / Spirostreptida	Crop feeder	A	A	2, F	5	10 yrs	Unk	2	Pu, Ps, L	CR	RD	S, M, PP	3	3
<i>Speculitermes singalensis</i> Insecta / Isoptera	Detritus feeder	D	B	Many, F	Unk	-	Unk	2	L, Lf	EN	RD	S, M, Hm, Lh, Lm, PP	3	3
<i>Strandesia bicornuta</i> Oristacca / Podocopida	Littoral, Benthic	D	B	2, F	10	10 yrs	Unk	2, 4	L, Pu, I	EN	RD	Hm	No	1
<i>Strandesia elongata</i> Oristacca / Podocopida	Littoral, Benthic	D	B	10, F	10	10 yrs	Unk	2, 4	L, Pu, I	EN	RD	Hm	No	1
<i>Strandesia flavescens</i> Oristacca / Podocopida	Littoral, Benthic	B	B	2	10	10 yrs	Unk	2, 4	L, Pu, I	EN	RD	Hm	No	1

Species	Habit	Range	Area	No. Of Loc/ F	% Decline	Year/ gen.	Pop. No.	Data quality	Threats	IUCN	Crit.	Research recom.	Capt. breed	Lev. diff.
<i>Strandesia indica</i> Oristacca / Podocopida	Littoral	C	C	5, F	10	10 yrs	Unk	2, 4	L, Pu, I	VU	RD	Hm	No	1
<i>Strandesia labiata</i> Oristacca / Podocopida	Littoral, Benthic	D	D	8, F	10	10 yrs	Unk	2, 4	L, Pu, I	LR-nt	RD	Hm	No	1
<i>Strandesia purpurascens</i> Oristacca / Podocopida	Littoral, Benthic	B	B	2	10	10 yrs	Unk	2, 4	L, Pu, I	EN	RD	Hm	No	1
<i>Streptogonopus jerdoni</i> Myriapoda / Polydesmida	Phytophagous feeders, Fungivorous	B	C	5	No	Unk	Unk	1, 2	I, Sd	EN	RD	T, M, Lh, PP	3	2
<i>Sulcospira hugeli</i> Pelecypoda / Megagastropoda	Attached to substratum	B	C	3	20	10 yrs	Unk	2	L, Pu	EN	RD	S, Hm	No	1
<i>Synectrychotes calimerei</i> Insecta / Hemiptera	Underneath barks	A	A	1	Unk	Unk	Unk	2	I, L, Gr	CR	RD	S, Lh	No	No
<i>Tetramorium rossi</i> Insecta / Hymenoptera	Unk	Unk	Unk	1	Unk	-	Unk	2,3	Unk	DD	—	S, M, Lh, PP	No	Unk
<i>Tetraponera aitkeni</i> Insecta / Hymenoptera	Arboreal species	D	D	Many	Stable	Unk	Unk	1	No	LR-lc	—	M, Lh	No	Unk
<i>Thelyphonus sepiaris</i> Arachnida / Uropygi	Nocturnal, carnivorous	D	D	Many	10	10 yrs	Unk	2, 3	L	LR-nt	—	M, S, Lh, PP	No	1
<i>Tricimbomyia muzhiyarensis</i> Insecta / Diptera	Deciduous & semi-evergreen forests	A	A	1	Unk	-	Unk	1	L	CR	RD	S, Lh, PP	No	3
<i>Trinervitermes biformis</i> Insecta / Isoptera	Grass and litter feeding	D	C	Many, F	30	10 yrs	Unk	2	L, Ps	VU	RD PR	M, Lm, Lr, P	3	3
<i>Truxalis indica</i> Insecta / Orthoptera	Graminivorous (specific to grass)	B	C	7, F	Unk	-	Unk	1	L	EN	RD	S, M, Lr, P	3	1
<i>Velitra neelai</i> Insecta / Hemiptera	Underneath barks	A	A	1	Unk	Unk	Unk	2	Unk	VU	PR	S, Lh, Hm	3	Unk
<i>Viviparus variata</i> Pelecypoda / Megagastropoda	Shallow water, Benthic	B	B	8, F	10	10 yrs	Unk	2, 5	L, Pu	EN	RD	S	No	1
<i>Xenobolus acuticonus</i> Myriapoda / Spirobolida	Litter feeding leaves under barks	C	C	Many	No	Unk	Unk	2	C, Sd	LR-nt	—	M, S	No	Unk
<i>Zarytes squalina</i> Insecta / Orthoptera	Phytophagous	B	A	3, F	10-20	10 yrs	Unk	2	L, I	CR	RD	S, M, Lr, Lh, P	3	1

# **Selected Soil Invertebrates of Southern India**

## **Report**

**Biodiversity Conservation Prioritisation Project, India -- Endangered Species Project  
Conservation Assessment and Management Plan (C.A.M.P.) Workshops**

**Selected Soil Invertebrates of Southern India  
Hosted by Zoological Survey of India, Southern Regional Station  
Chennai, 24 – 28 February 1997**

**REPORT**

**Convention on Biological Diversity**

The Convention on Biological Diversity adopted in Nairobi in May 1992 and signed by more than 150 states in June 1992 at Rio de Janeiro, came into force officially in December 1993. The Convention is a “framework agreement” in that its provisions are expressed as goals and policies (as opposed to “obligations”), leaving the implementation of its provisions up to individual parties (the states) at the national level. In the Convention, the importance of non-governmental organisations in implementing the provisions was specifically mentioned.

Articles in the Convention cover objectives, terminology, principles, legislation, cooperation and strategy as applied to various issues and methodology. One of the very basic methods of organising conservation action is prioritisation. Article 7 of the Convention deals with Identification and Monitoring, calling on parties to identify components of biological diversity important for its conservation and sustainable use. Components of an “indicative list” include:

- \* Ecosystems and habitats
- \* Species and communities, and
- \* Described genomes and genes of social, scientific and economic value.

Knowledge of species and communities can reveal crucial facts necessary to the management of ecosystems and habitats as well as to the identification of important genomes and genes. Identification, listing and prioritisation of species are one of the important tasks in conservation. In India, it is well known by biologists across many taxon groups that species information has many gaps. In many instances, the species has not been surveyed or studied since its description, perhaps in the 18th or 19th century. Even species that have been studied more recently in the 20th century, require constant attention due to the fact that the very fabric of the earth is changing so rapidly. It is common knowledge today that the ecosystems and habitats which sustain species are deteriorating rapidly as a result of population expansion, industrialisation, and the build-up of habits resulting from decades and centuries of thinking the Earth and its resources were unlimited. Awareness of this fact is, of course, the *raison d'être* for the Convention on Biological Diversity itself.

**Biodiversity Conservation Prioritisation Project – Endangered Species Component**

The Biodiversity Conservation Prioritisation Project (BCPP) is an attempt to amalgamate the knowledge of government, academics, enthusiasts, and other knowledgeable persons of India to meet obligations of the Convention on Biological Diversity. This Project was funded by the Biodiversity Support Program, a consortium of organisations - USAID, World Resources Institute and the Nature Conservancy, and coordinated by World Wide Fund for Nature. It consists of three segments: sites, species and strategies for biodiversity conservation. The overall aim of the species segment is to list out species which need to be conserved for their biodiversity value in order of priority, under categories of medicinal and economic value, wild relatives of domesticated and cultivated species and other endangered fauna, flora and micro-organisms.

In the Planning Workshop for the Project, an Endangered Species Subgroup decided to use the IUCN criteria to assess the conservation status of a large part of Indian species diversity. A workshop “process” called the Conservation Assessment and Management Plan (CAMP) developed by the Conservation Breeding Specialist Group, SSC, IUCN was selected by the subgroup as the methodology to use for conducting the assessments. CBSG, India, a Regional Network of the Conservation Breeding Specialist Group was asked to conduct the “CAMP” workshops on the basis of their experience and expertise in organisation, networking and facilitation. The IUCN Red List criteria are central to the CAMP process.

**IUCN Red List**

Earlier efforts to monitor the earth's resources and activate conservation measures include the Red Data Books of IUCN, now called the World Conservation Union. The IUCN Red Data Books have provided a guide for species conservation status for the last three decades. A few years ago, it was felt that both the categories and

methodology used by individuals compiling the Red Data Books needed review. Over a seven-year period, the IUCN Criteria for Endangerment used in compiling Red Data Books, were examined, revised, reviewed and improved over six different iterations. The present system, the IUCN Red List Categories, 1994, is more objective, numerate, and consistent for all groups. The revised IUCN Red List Categories provide a methodology for assessment and categorisation, which can be applied, to any group of organisms (except microorganisms). The revised IUCN Red List criteria is being used now by conservation actioners and scientists all over the world and is considered the best method available today for assessing the conservation status of species.

## **Conservation Assessment and Management Plan**

One of the great difficulties of carrying out basic tasks such as identification and monitoring, creation of management and action plans and recovery programmes for species, is coordinating the great mass and variety of specialist knowledge and agency authority. Much time and energy is wasted in duplication of effort, territorial and ownership disputes, and inability to find and adhere to a common ground. The business community, realising the importance of effective communication and teamwork, has developed a broad spectrum of management strategies and tools which are used daily to manage time and human interaction. More and more, the conservation community is recognising the importance of using some of these tools to achieve their goals, rapidly and effectively. The Conservation Breeding Specialist Group (CBSG) of the Species Survival Commission of IUCN has pioneered the use of some of these tools in well-planned strategic problem-solving and task-performance exercises. CBSG calls these exercises “processes” because — in the contemporary conservation scenario — nothing is static except the fact of change itself.

The Conservation Assessment and Management Plan Workshop was developed by CBSG for the purpose of prioritising species for conservation action including an *ex situ* component. Over the last decade, CBSG has conducted dozens of CAMP workshops for literally hundreds of species, using (and thereby testing) the then current iteration of the IUCN Red List Categories as their basic methodology to glean a status ranking. The IUCN Red List guidelines and criteria are used in all CAMP workshops to assess and assign a category to each species. A list of all CAMP workshops is given at the end of this Report.

For the CAMP Workshop CBSG has developed a Taxon Data Sheet and a Spreadsheet format which includes parameters necessary to assess the IUCN status as well as provide other useful information necessary for creating management and action plans. The spreadsheet organises the information in a concise manner so that it is accessible at a glance. The information in this Report is organised on spreadsheets in the Report section, followed by the individual Taxon Data Sheets. A CAMP Workshop also utilises principles of management psychology to guide human interaction. A set of Guidelines for Group Interaction is presented to the workshop participants who agree as a group to work accordingly in order to complete the task. Objective Facilitators (persons trained in management skills and the workshop process) are used to lead and guide the workshop so that individual and professional bias does not affect group decisions and to assist in maintaining the integrity and focus of the workshop.

CAMP Workshops bring together a variety of specialists and enthusiasts from academic, government, managerial, and even the commercial sector to evaluate taxa for setting priorities for conservation action. The fear of loss and hope of recovery of species drives CAMP Workshops. Individuals part with unpublished information in order to contribute to a body of information which will provide strategic guidance for application of intensive management and information gathering. CAMP Workshop results, are, or should be, dynamic, leading to specific conservation activities in forest, market, classroom, courtroom — locally and nationally as well as on the international stage.

## **Conservation of Invertebrates**

Invertebrates form the backbone of biodiversity, yet, they are the least understood and most neglected group of taxa. The amount of knowledge of invertebrates compared to that of vertebrates and plants is inversely proportional to their respective numbers. Invertebrates make up more than 75% of total number of species of faunal organism, as illustrated by the figure below.

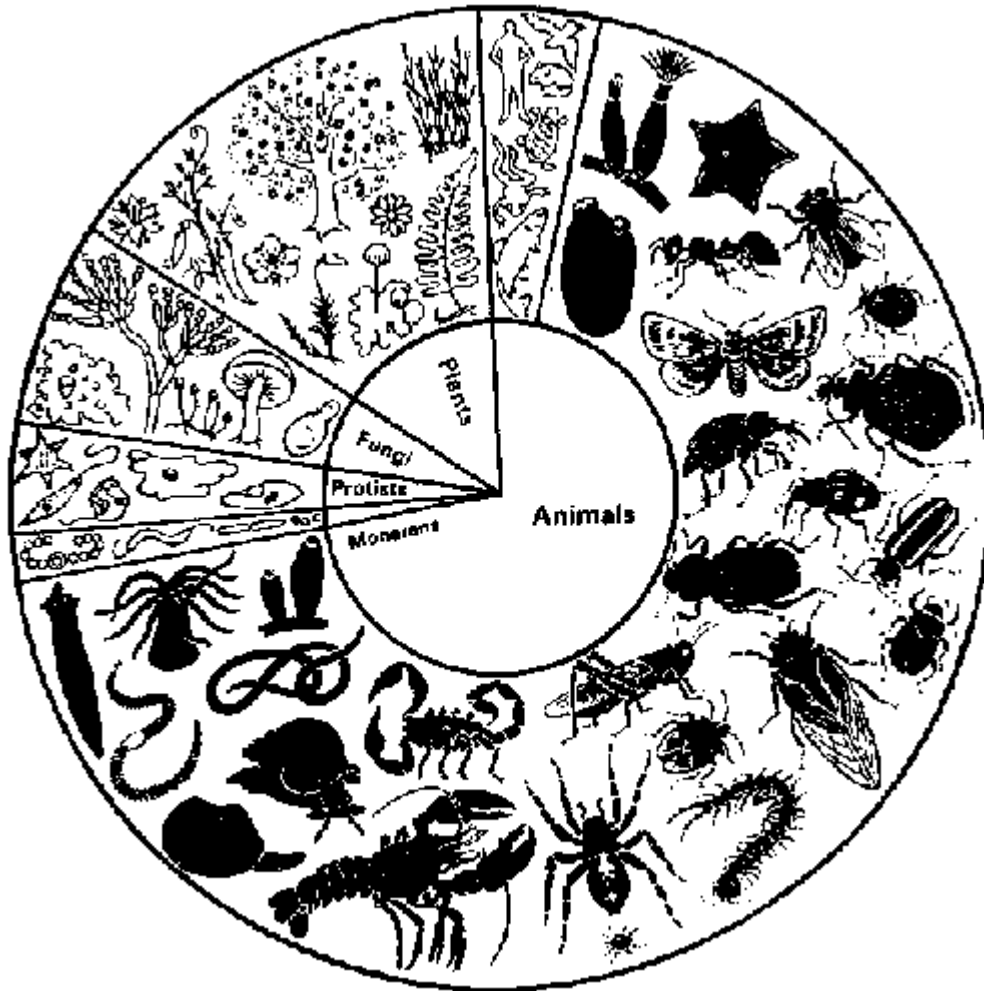
According to some biologists, there may be 30 – 40 million species of invertebrates on the earth, although only half a million have been described. If there are 30 million species of invertebrates, the number of higher forms is almost negligible in the overall picture. Saving biodiversity, therefore, means saving invertebrates.

In India a relatively large number of invertebrates have been described – about 72,000 according to a Zoological Survey of India publication (1991). The proportion of Indian invertebrates to Indian vertebrates and plants follows a similar pattern as described for the whole world. Moreover, much of the research interest in India is more oriented towards their being pests and how to get rid of them, than in their being useful and how to conserve them. With respect to conservation or conservation assessment, one faces a formidable task in



deciding how and what to assess and where to begin. Since there was no possibility of covering all Indian invertebrates, our objective was simply to provide a model workshop, which could be used as a starting point for other exercises. In doing do, we also attempted to find ways to more easily address the vast numbers of invertebrate species.

### The Biodiversity wheel



Soil invertebrates were selected as the target group for assessment in this workshop. This group was chosen because 1) soil invertebrates are singularly important due to their role in maintaining the condition of the soil; 2) rampant loss of habitat and quality of habitat; 3) suggestions by scientists that even so-called common invertebrates such as ants and termites were not observed now as much as previously; 4) no conservation assessment had ever been done for soil invertebrates before, and finally 5) our desire to avoid obviously charismatic groups such as butterflies.

### Goals of the Workshop on selected species of southern Indian soil invertebrates

1. To prepare checklists of species of soil invertebrates of different orders which would be used for a) selecting species for conservation assessment according to IUCN guidelines and b) ranking (all) for research priorities on the basis of commonly known parameters,
2. To assess and assign a conservation status using population, habitat, and threat parameters as given in the revised IUCN Red List Criteria to soil invertebrate species selected by the workshop participants,
3. To collect information from participants which would be useful in drawing up action plans and management plans,

4. To produce a Conservation Assessment and Management Plan Draft for species assessed in the workshop for review by participants and, finally, distribution to individuals and institutions relevant to invertebrate conservation.

## Results and Discussion

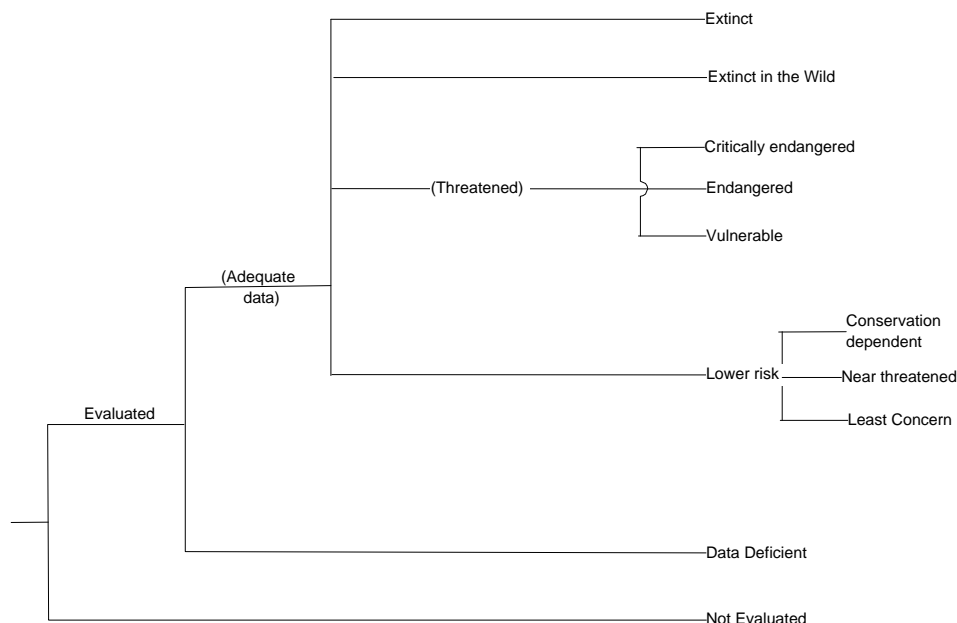
The Red Data Book of threatened animals (1996) compiled by the Species Survival Commission, IUCN lists 1891 invertebrates of the world as being threatened, 193 of which are from India. The 1990 and 1994 editions of the Red Data Book listed 28 and 148 species respectively. These numbers are not so much indicative of how many invertebrates actually are threatened in India as the sample size is small, but of a trend towards growing numbers of threatened species and the need for more systematic studies. Considering that there are 75,000 described species of Indian invertebrates, the number may also indicate how little documentation of invertebrate status and decline has been done.

The Zoological Survey of India, which compiles national Red Data Books, is in the process of assembling a list of threatened invertebrates of India. However, the assessments are based on the old IUCN Red List system and not on the 1994 IUCN Red List categories; the old categories of assessment were Extinct, Endangered, Vulnerable, Rare, Indeterminate, Insufficiently Known and Out of Danger.

The IUCN Red List Categories since 1991 have undergone a series of revisions to enhance their applicability to organisms other than mammals and to reflect the development of the new conservation sciences, population dynamics and conservation biology of the last two decades. The current version of the categories was ratified by the IUCN general assembly in December 1994. The categories can be divided into 5 divisions listed and illustrated below. This workshop represents the first attempt in India to assess and categorise Indian invertebrates using the revised IUCN categories.

1. Extinct (Extinct and Extinct in the Wild),
2. Threatened (Critically Endangered, Endangered and Vulnerable),
3. Non-threatened (Lower Risk -- near threatened, conservation dependent and least concern),
4. Data Deficient and
5. Not Evaluated.

### Structure of the Categories



## Methodology

Unlike other fauna and flora, information on invertebrates is very scanty and even if available, very scattered. One of the major problems with invertebrate taxonomy is the lack of reference material either in the form of museum specimen or literature. This is primarily because the type specimen have been stored in Museums

abroad and these, as well as publications, are not easily available in India due to prohibitive costs. Added to this is the fact that many descriptions are published in spurious journals. These factors made compiling information on soil invertebrates difficult.

The first step was to identify and network researchers all over the country and solicit checklists for different orders.

The C.A.M.P. process as described earlier, depends on gathering available data from a variety of specialists with particular emphasis on field biologists with direct observational experience with species and habitats. Therefore the first step in such an exercise is to identify and network researchers throughout the country and solicit their checklist for different orders. This task was made easier for invertebrates due to the networking project of the CBSG, India Invertebrate Special Interest Group, which is a project sponsored by the Invertebrate Conservation Centre, London Zoo. After a session the first day for overview of the taxon group, IUCN Red List categories, and workshop ground rules, participants form working groups to discuss each targeted species in detail in a structured, interactive group process. The guidelines provided by IUCN for each data requirement and for deriving status of a species from this data has been formatted on a taxon data sheet, which participants fill out for every species.

After forming working groups, participants decided on the following parameters for the exercise:

1. southern Indian endemic taxa with sufficient information for discussion would be taken up first, and non-endemics afterwards.
2. soil invertebrates only would be assessed with the working definition of "soil invertebrate" being determined by the fact of a crucial part of the life cycle of the organism being dependent on soil.

## Assessments

Ninety-four soil invertebrate taxa were assessed at the workshop of which 45 were assessed "Globally", 43 "Regionally" and 7 "Nationally". One taxon (mollusc) was Not Evaluated since it was felt that not enough work had been done to suggest its validity as a species. Assessments for endemic taxa are described as "Global", even if their range is small, because they occur only in that area in the whole world. The remaining taxa were assessed either as "Regionally" because they occur in other areas within the country or "Nationally" because they are assessed for their complete distributional range in India (Table 2). Since this workshop was restricted to soil invertebrates of southern India, "Global" assessment was made for taxa whose entire distributional range was restricted to southern India. For taxa which are endemic to India with a wider distribution within the country, the assessment was "Regional" (for southern India) and for those which are non-endemic to India but their distribution within India is restricted to southern India, the assessment was "National". The terms "Global", "Regional" and "National" as applied in this workshop are explained in detail in the last section of this report.

The 3 working groups formed at the workshop were the Entomological group which assessed 38 taxa, the Non-entomological group which assessed 20 taxa and the Aquatic group which assessed 36 taxa respectively. Table 1 indicates the different taxa and their orders according to working group. Of the 38 entomological taxa assessed 16 were assessed at a separate exercise at the Madras Christian College, Tambaram. The taxa were all assassin bugs (Reduviidae). The most represented orders in terms of number of taxa assessed per order are Hemiptera (16 taxa), Megagastropoda (13 taxa), Podocopida (10 taxa) and Hymenoptera and Scorpiones (7 taxa each)

## Results

Of the 94 taxa assessed at the workshop, a very high number of sixty-four percent (64%) were categorised as "threatened". This is because of threats to the species in the wild as perceived by the participants. It should be noted however, that there was a tendency to select taxa for assessment which were known to be rare in distribution and having declined in the wild. Therefore the situation as reflected in this sample list does not reflect the situation for all soil invertebrates. If such were the case, that 64% of all soil invertebrates were threatened, we would be in a most precarious position indeed and probably already suffering unimaginable ecological and environmental perturbations as a result. This sample is useful, however, to indicate that current ignorance of soil invertebrates could lead to a highly dangerous scenario involving degeneration of the very fabric of the earth, that is, the soil itself.

Another caution when considering these results is that many invertebrates are known only from a single location since their first description, with few or no records of the same after initial studies. These taxa would qualify for a threat category simply on the basis of their single location status, or on the size of the area they occupy, or the present condition of the habitat from which they were described. Given the number, variety and small body size of soil invertebrates, it is not impossible that species ascribed to one area only could actually have a much larger range which would change its status. The fact of such species having been assessed as threatened, however,

calls attention to them, which may lead to further identification in other areas. Considering the nature of ecosystems, however, the disappearance of one species from a natural area is a matter of concern for that area whether or not the species is actually limited to a single location.

**Table 1. Taxa assessed in the CAMP listed by different working groups.**

ENTOMOLOGICAL GROUP	AQUATIC GROUP	NON-ENTOMOLOGICAL GROUP
<i>Acanthaspis alagiriensis</i> * Insecta / Hemiptera	<i>Bellamyia bengalensis</i> Pelecypoda / Megagastropoda	<i>Chondromorpha kelaarki</i> Myriapoda / Polydesmida
<i>Acanthaspis carinata</i> * Insecta / Hemiptera	<i>Bellamyia dissimilis</i> Pelecypoda / Megagastropoda	<i>Dichogaster curgensis</i> * Oligochaeta / Lumbricina
<i>Acanthaspis minutum</i> * Insecta / Hemiptera	<i>Bithynia stenothyroides</i> Pelecypoda / Megagastropoda	<i>Drawida nilamburensis</i> * Oligochaeta / Moniligastrida
<i>Acanthaspis nigripes</i> * Insecta / Hemiptera	<i>Corbicula regularis</i> Pelecypoda / Eulamellibranchiata	<i>Heterometrus barberi</i> * Arachnida / Scorpiones
<i>Acanthaspis pedestris</i> * Insecta / Hemiptera	<i>Cypris dravidensis</i> * Oristacca / Podocopida	<i>Heterometrus swammerdami</i> Arachnida / Scorpiones
<i>Acanthaspis siruvani</i> * Insecta / Hemiptera	<i>Cypris protubera</i> * Oristacca / Podocopida	<i>Heterometrus malapuramensis</i> * Arachnida / Scorpiones
<i>Alstonitermes flavescens</i> * Insecta / Isoptera	<i>Cypris subglobosa</i> Oristacca / Podocopida	<i>Heterometrus keralensis</i> * Arachnida / Scorpiones
<i>Amblyopone bellii</i> Insecta / Hymenoptera	<i>Eucypris bispinosa</i> * Oristacca / Podocopida	<i>Isometrus brachycentrus</i> * Arachnida / Scorpiones
<i>Aularchis miliaris</i> Insecta / Orthoptera	<i>Gyraulus convexisculus</i> Pelecypoda / Basommatophora	<i>Lychas tricarinatus</i> Arachnida / Scorpiones
<i>Creinatogaster rogenhoferi</i> Insecta / Hymenoptera	<i>Gyraulus saigonensis</i> Pelecypoda / Basommatophora	<i>Ocnerodrilus occidentalis</i> Arachnida / Scorpiones
<i>Ectrychotes bharathi</i> * Insecta / Hemiptera	<i>Ilyocypris spinifer</i> Oristacca / Cladocera	<i>Octochaetona serrata</i> * Oligochaeta / Lumbricina
<i>Edocla punctatum</i> * Insecta / Hemiptera	<i>Indoplanorbis exustus</i> Pelecypoda / Basommatophora	<i>Mesobuthus hendersoni</i> * Oligochaeta / Lumbricina
<i>Edocla heberii</i> * Insecta / Hemiptera	<i>Lamelidens marginalis</i> Pelecypoda / Eulamellibranchiata	<i>Octonochaeta rosea</i> Oligochaeta / Lumbricina
<i>Edocla maculatus</i> * Insecta / Hemiptera	<i>Lymnaea acuminata</i> Pelecypoda / Basommatophora	<i>Perionyx excavatus</i> Oligochaeta / Lumbricina
<i>Eucoptacrella ceylonica</i> Insecta / Orthoptera	<i>Lymnaea luteola</i> Pelecypoda / Basommatophora	<i>Phyllogonostreptus nigrolabiatus</i> Myriapoda / Spirostreptida
<i>Haematorrhophus fovealis</i> * Insecta / Hemiptera	<i>Macrothrix laticornis</i> Oristacca / Cladocera	<i>Polydrepanum tamilum</i> * Myriapoda / Polydesmida
<i>H. ruguloscutellaris</i> * Insecta / Hemiptera	<i>Melania scabra</i> Pelecypoda / Megagastropoda	<i>Sechelleptus importatus</i> Myriapoda / Spirostreptida
<i>Hemihematorrhophus planidorsatus</i> * Insecta / Hemiptera	<i>Melania tuberculata</i> Pelecypoda / Megagastropoda	<i>Streptogonopus jerdoni</i> Myriapoda / Polydesmida
<i>Macrotermes estherae</i> Insecta / Isoptera	<i>Mysorella costigera</i> Pelecypoda / Megagastropoda	<i>Thelyphonus sepia</i> Arachnida / Uropygi
<i>Meranoplus bellii</i> * Insecta / Hymenoptera	<i>Ocypoda ceratophthalma</i> Oristacca / Decapoda	<i>Xenobolus acuticonus</i> Myriapoda / Spirobolida
<i>Mesacanthaspis kovaiensis</i> * Insecta / Hemiptera	<i>Ocypoda cordimana</i> Oristacca / Decapoda	
<i>Microcerotermes fletcheri</i> Insecta / Isoptera	<i>Ocypoda macrocera</i> * Oristacca / Decapoda	
<i>Nasutitermes indicola</i> Insecta / Isoptera	<i>Ocypoda platyarsis</i> Oristacca / Decapoda	
<i>Odontotermes brunneus</i> * Insecta / Isoptera	<i>Paludomus monile</i> * Pelecypoda / Megagastropoda	
<i>Odontotermes wallonensis</i> Insecta / Isoptera	<i>Paludomus stomatodon</i> * Pelecypoda / Megagastropoda	
<i>Oecophylla smaragdina</i> Insecta / Hymenoptera	<i>Paludomus tanschaurica</i> Pelecypoda / Megagastropoda	
<i>Plagirolepis jerdonii</i> Insecta / Hymenoptera	<i>Parreysia corrugata</i> Pelecypoda / Eulamellibranchiata	
<i>Poekilocerus pictus</i> Insecta / Orthoptera	<i>Pila globosa</i> Pelecypoda / Megagastropoda	

ENTOMOLOGICAL GROUP	AQUATIC GROUP	NON-ENTOMOLOGICAL GROUP
<i>Psilacrum convexa</i> * Insecta / Diptera	<i>Pila virens</i> * Pelecypoda / Megagastropoda	
<i>Speculitermes singalensis</i> * Insecta / Isoptera	<i>Strandesia bicornuta</i> * Oristacca / Podocopida	
<i>Synectrychotes calimerej</i> * Insecta / Hemiptera	<i>Strandesia elongata</i> * Oristacca / Podocopida	
<i>Tetramorium rossi</i> * Insecta / Hymenoptera	<i>Strandesia flavescens</i> * Oristacca / Podocopida	
<i>Tetraponera aitkeni</i> Insecta/ Hymenoptera	<i>Strandesia indica</i> Oristacca / Podocopida	
<i>Tricimbomyia muzhiyarensis</i> * Insecta / Diptera	<i>Strandesia labiata</i> Oristacca / Podocopida	
<i>Trinervitermes biformis</i> Insecta / Isoptera	<i>Strandesia purpurascens</i> * Oristacca / Podocopida	
<i>Truxalis indica</i> Insecta / Orthoptera	<i>Sulcospira hugeli</i> * Pelecypoda / Megagastropoda	
<i>Velitra neelai</i> * Insecta / Hemiptera	<i>Viviparus variata</i> Pelecypoda / Megagastropoda	
<i>Zarytes squalina</i> * Insecta / Orthoptera		* Assessed Globally

**Table 2. Basis of criteria for assessing selected species of soil invertebrates of southern India**

Species	IUCN	Assessed	Threatened due to	Criteria
<i>Acanthaspis alagiriensis</i>	CR	Globally	Restricted distribution	B1, 2c
<i>Acanthaspis carinata</i>	CR	Globally	Restricted distribution	B1, 2c
<i>Acanthaspis minutum</i>	VU	Globally	Restricted population	D2
<i>Acanthaspis nigripes</i>	VU	Globally	Restricted population	D2
<i>Acanthaspis pedestris</i>	LR-nt	Globally	—	—
<i>Acanthaspis siruvani</i>	VU	Globally	Restricted population	D2
<i>Alstonitermes flavescens</i>	EN	Globally	Population reduction; Restricted distribution	A1a,1c; B1, 2a, 2b, 2c
<i>Amblyopone bellii</i>	DD	Southern India	—	—
<i>Aularchis miliaris</i>	LR-nt	Southern India	—	—
<i>Bellamyia bengalensis</i>	LR-nt	Southern India	—	—
<i>Bellamyia dissimilis</i>	LR-nt	Southern India	—	—
<i>Bithynia stenothyroides</i>	VU	Nationally	Restricted distribution	B1, 2a, 2c
<i>Chondromorpha kelaarki</i>	LR-lc	Southern India	—	—
<i>Corbicula regularis</i>	DD	Southern India	—	—
<i>Crematogaster rogenhoferi</i>	LR-lc	Southern India	—	—
<i>Cypris dravidensis</i>	EN	Globally	Restricted distribution	B1, 2c
<i>Cypris protubera</i>	EN	Globally	Restricted distribution	B1, 2a, 2c
<i>Cypris subglobosa</i>	LR-nt	Southern India	—	—
<i>Dichogaster curgensis</i>	LR-lc	Globally	—	—
<i>Drawida nilamburensis</i>	CR	Globally	Restricted distribution	B1, 2a, 2b, 2c
<i>Ectrychotes bharathi</i>	CR	Globally	Restricted distribution	B1, 2c
<i>Edocia punctatum</i>	CR	Globally	Restricted distribution	B1, 2c
<i>Edocla heberii</i>	CR	Globally	Restricted distribution	B1, 2c
<i>Edocla maculatus</i>	EN	Globally	Restricted distribution	B1, 2c
<i>Eucoptacrella ceylonica</i>	CR	Southern India	Restricted distribution	B1, 2a, 2b,2c
<i>Eucypris bispinosa</i>	CR	Globally	Restricted distribution	B1, 2a, 2c
<i>Gyraulus convexiusculus</i>	VU	Southern India	Restricted distribution	B1, 2a, 2c
<i>Gyraulus saigonensis</i>	LR-nt	Southern India	—	—
<i>Haematorrhophus fovealis</i>	CR	Globally	Restricted distribution	B1, 2c
<i>Haematorrhophus ruguloscutellaris</i>	VU	Globally	Restricted population	D2
<i>Hemihematorrhophus planidorsatus</i>	EN	Globally	Restricted distribution	B1, 2c
<i>Heterometrus barberi</i>	EN	Globally	Restricted distribution	B1, 2c
<i>Heterometrus keralensis</i>	EN	Globally	Restricted distribution	B1, 2c
<i>Heterometrus malapuramensis</i>	VU	Southern India	Population reduction; Restricted distribution	A1c; B1, 2a, 2c

Species	IUCN	Assessed	Threatened due to	Criteria
<i>Heterometrus swammerdami</i>	VU	Southern India	Population reduction	A1a, 1c
<i>Ilyocryptus spinifer</i>	LR-nt	Southern India	—	—
<i>Indoplanorbis exustus</i>	LR-nt	Southern India	—	—
<i>Isometrus brachycentrus</i>	VU	Globally	Restricted distribution	B1, 2a, 2c
<i>Lamellidens marginalis</i>	LR-nt	Southern India	—	—
<i>Lychas tricarinatus</i>	LR-lc	Southern India	—	—
<i>Lymnaea acuminata</i>	NE	Not applicable	—	—
<i>Lymnaea luteola</i>	LR-nt	Southern India	—	—
<i>Macrotermes estherae</i>	EN	Southern India	Restricted distribution	B1, 2a, 2b, 2c, 2d
<i>Macrothrix laticornis</i>	LR-nt	Southern India	—	—
<i>Melania scabra</i>	VU	Southern India	Population reduction	A1c
<i>Melania tuberculata</i>	VU	Southern India	Population reduction	A1c
<i>Meranoplus bellii</i>	DD	Globally	—	—
<i>Mesacanthaspis kovaiensis</i>	CR	Globally	Restricted distribution	B1, 2c
<i>Mesobuthus hendersoni</i>	LR-lc	Globally	—	—
<i>Microcerotermes fletcheri</i>	VU	Southern India	Population reduction; Restricted distribution	A1a, 1c; B1, 2a, 2b, 2c
<i>Mysorella costigera</i>	LR-nt	Southern India	—	—
<i>Nasutitermes indicola</i>	VU	Nationally	Population reduction; Restricted distribution	A1a, 1c; B1, 2a, 2c
<i>Ocnerodrilus occidentalis</i>	EN	Southern India	Restricted distribution	B1, 2c
<i>Octochaetona serrata</i>	VU	Globally	Restricted distribution	B1, 2c, 2e
<i>Octonochaeta rosea</i>	Lr-nt	Southern India	Restricted distribution	B1, 2c
<i>Ocypoda ceratophthalma</i>	LR-nt	Nationally	—	—
<i>Ocypoda cordimana</i>	EN	Nationally	Restricted distribution	B1, 2a, 2c
<i>Ocypoda macrocera</i>	EN	Globally	Restricted distribution	B1, 2b, 2c
<i>Ocypoda platyarsis</i>	VU	Nationally	Population reduction	A1c
<i>Odontotermes brunneus</i>	VU	Globally	Population reduction; Restricted distribution	A1a, 1c; B1, 2a, 2c
<i>Odontotermes wallonensis</i>	VU	Southern India	Restricted distribution	B1, 2c
<i>Oecophylla smaragdina</i>	LR-lc	Southern India	—	—
<i>Paludomus monile</i>	EN	Globally	Restricted distribution	B1, 2b
<i>Paludomus stomatodon</i>	CR	Globally	Restricted distribution	B1, 2b
<i>Paludomus tanschaurica</i>	VU	Southern India	Population reduction	A1c
<i>Parreysia corrugata</i>	VU	Southern India	Restricted distribution	B1, 2a, 2c
<i>Perionyx excavatus</i>	LR-nt	Southern India	—	—
<i>Phyllogonostreptus nigrolabiatus</i>	LR-nt	Southern India	—	—
<i>Pila globosa</i>	VU	Southern India	Population reduction	A1c
<i>Pila virens</i>	VU	Globally	Population reduction Restricted distribution	A1a, 1c; B1, 2a, 2c
<i>Plagiolepis jerdonii</i>	LR-lc	Southern India	—	—
<i>Poecilocerus pictus</i>	LR-lc	Southern India	—	—
<i>Polydrepanum tamilum</i>	LR-nt	Globally	—	—
<i>Psilacrum convexa</i>	CR	Globally	Restricted distribution	B1, 2a, 2b, 2c
<i>Sechelleptus importatus</i>	CR	Nationally	Restricted distribution	B1, 2c
<i>Speculitermes sinhalensis</i>	EN	Globally	Restricted distribution	B1, 2c
<i>Strandesia bicornuta</i>	EN	Globally	Restricted distribution	B1, 2a
<i>Strandesia elongata</i>	EN	Globally	Restricted distribution	B1, 2a
<i>Strandesia flavescens</i>	EN	Globally	Restricted distribution	B1, 2a
<i>Strandesia indica</i>	VU	Southern India	Restricted distribution	B1, 2a, 2c
<i>Strandesia labiata</i>	LR-nt	Southern India	--	--
<i>Strandesia purpurascens</i>	EN	Globally	Restricted distribution	B1, 2a, 2c
<i>Streptogonopus jerdoni</i>	EN	Southern India	Restricted distribution	B1, 2c
<i>Sulcospira hugeli</i>	EN	Globally	Restricted distribution	B1, 2a, 2c
<i>Synectrychotes calimeri</i>	CR	Globally	Restricted distribution	B1, 2c
<i>Tetramorium rossi</i>	DD	Globally	—	—
<i>Tetraponera aitkeni</i>	LR-lc	Southern India	—	—
<i>Thelyphonus sepiaris</i>	LR-nt	Nationally	—	—
<i>Tricimbomyia muzhiyarensis</i>	CR	Globally	Restricted distribution	B1, 2c

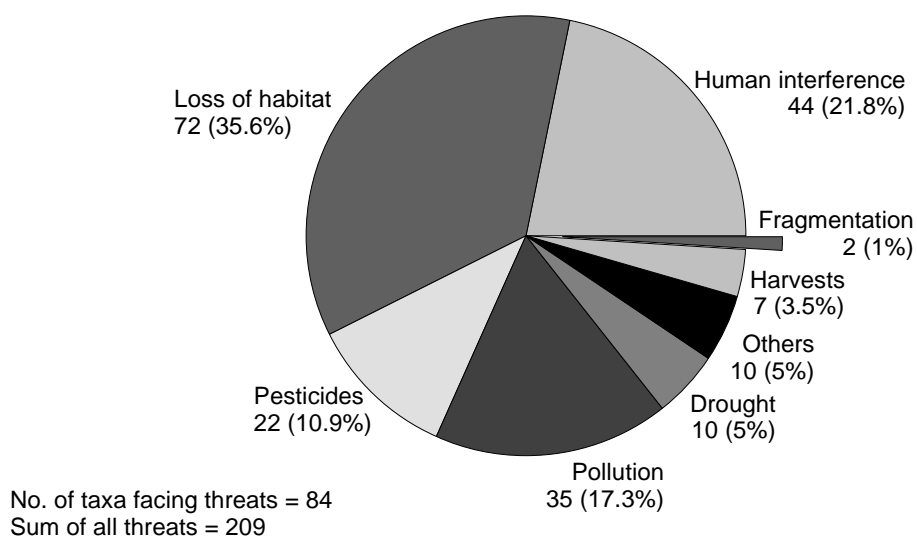
Species	IUCN	Assessed	Threatened due to	Criteria
<i>Trinervitermes biformis</i>	VU	Southern India	Population reduction Restricted distribution	A1a, 1c B1, 2c
<i>Truxalis indica</i>	EN	Southern India	Restricted distribution	B1, 2c
<i>Velitra neelai</i>	VU	Globally	—	—
<i>Viviparus variata</i>	EN	Southern India	Restricted distribution	B1, 2b, 2c
<i>Xenobolus acuticonus</i>	LR-nt	Southern India	—	—
<i>Zarytes squalina</i>	CR	Globally	Restricted distribution	B1, 2a, 2b

## Threats

The reasons for most of the taxa being threatened are primarily because of loss of habitat, human interference, pesticides and pollution. Other factors of lesser proportions are habitat fragmentation, harvest for food, harvest in general, drought and others such as changes in edaphic factors, grazing and decline in prey species. The following figure and table 3 indicate the proportion of threat and the types of threats affecting every taxon.

Trade is not a major threat at least to the taxa assessed here. Only one species, *Poeciloceris pictus*, the painted grasshopper is collected widely for laboratory purposes.

### Threats to soil invertebrates



**Table 3. Threats affecting the taxa**

Taxon	Threats	IUCN
<i>Acanthaspis nigripes</i>	Loss of habitat, Human interference	DD
<i>Acanthaspis carinata</i>	Loss of habitat, Human interference (Manmade fire)	CR
<i>Acanthaspis minutum</i>	Not known	DD
<i>Acanthaspis pedestris</i>	Loss of habitat, Human interference, Decline in prey species	LRnt
<i>Acanthaspis siruvanii</i>	Not known	DD
<i>Acanthaspis alagiriensis</i>	Human interference	CR
<i>Alstonitermis flavescens</i>	Pesticides, Loss of habitat	EN
<i>Amblyopone bellii</i>	Not known	DD
<i>Aularchis miliaris</i>	Pesticides	LRnt
<i>Bellamyia bengalensis</i>	Pollution, Loss of habitat, Pesticides	LRnt
<i>Bellamyia dissemilis</i>	Pollution, Loss of habitat, Pesticides	LRnt

Taxon	Threats	IUCN
<i>Bithynia stenothyroides</i>	Loss of habitat, Pollution, Pesticides	VU
<i>Chondromorpha kelaarki</i>	Loss of habitat, Climate, Drought	LRlc
<i>Corbicula regularis</i>	Not known	DD
<i>Crematogaster rogenhoferi</i>	No	LRlc
<i>Cypris dravidensis</i>	Loss of habitat, Pollution, Human interference	EN
<i>Cypris protubera</i>	Loss of habitat, Pollution, Human interference	EN
<i>Cypris subglobosa</i>	Loss of habitat, Pollution, Human interference	LRnt
<i>Dichogaster curgensis</i>	Edaphic factors, Pesticides, Drought	LRlc
<i>Drawida nilamburensis</i>	Human interference, Loss of habitat	CR
<i>Ectrychotes bharathii</i>	Human interference, Loss of habitat	CR
<i>Edocla heberii</i>	Loss of habitat, Grazing	CR
<i>Edocla maculatus</i>	Human interference, Loss of habitat	EN
<i>Edocla punctatum</i>	Human interference	CR
<i>Eucoptacrella ceylonica</i>	Loss of habitat, Human interference	CR
<i>Eucypris bispinosa</i>	Loss of habitat, Pollution, Human interference	CR
<i>Gyraulus convexiusculus</i>	Loss of habitat, Pollution, Pesticides	VU
<i>Gyraulus saigonensis</i>	Loss of habitat, Pesticides, Pollution	LRnt
<i>Haematorrhophus fovealis</i>	Human interference	CR
<i>Haematorrhophus ruguloscutellaris</i>	Not known	CR
<i>Hemihematorrhophus planidorsatus</i>	Loss of habitat, Human interference, Grazing	EN
<i>Heterometrus barberi</i>	Human interference, Loss of habitat	EN
<i>Heterometrus swammerdami</i>	Loss of habitat, Change in Edaphic factors, Human interference, Drought	VU
<i>Heterometrus malapuramensis</i>	Loss of habitat	VU
<i>Heterometrus keralensis</i>	Human interference, Loss of habitat	EN
<i>Ilyocryptus spinifer</i>	Pollution, Loss of habitat, Pesticides	LRnt
<i>Indoplanorbis exustus</i>	Pollution, Loss of habitat, Pesticides	LRnt
<i>Isometrus brachycentrus</i>	Human interference, Loss of habitat	VU
<i>Lamellidens marginalis</i>	Loss of habitat, Harvest	LRnt
<i>Lychas tricarinatus</i>	Human interference, Loss of habitat	LRlc
<i>Lymnaea acuminata</i>	Pollution, Loss of habitat, Pesticides	NE
<i>Lymnaea luteola</i>	Pollution, Loss of habitat, Pesticides	LRnt
<i>Macrotermes estherae</i>	Loss of habitat; Edaphic factors	EN
<i>Macrothrix laticornis</i>	Pollution, Loss of habitat, Pesticides	LRnt
<i>Melania scabra</i>	Pollution, Loss of habitat, Pesticides	VU
<i>Melania tuberculata</i>	Pollution, Loss of habitat	VU
<i>Meranoplus bellii</i>	Not known	DD
<i>Mesacanthaspis kovaiensis</i>	Loss of habitat, Grazing, Human interference	CR
<i>Mesobuthus hendersoni</i>	Human interference, Loss of habitat	LRlc
<i>Microcerotermes fletcheri</i>	Loss of habitat, Human interference	VU
<i>Mysorella costigera</i>	Pollution, Loss of habitat, Pesticides	LRnt
<i>Nasutitermes indicola</i>	Loss of habitat	VU
<i>Ocnerodrilus occidentalis</i>	Loss of habitat, Drought	EN
<i>Octochaetona serrata</i>	Human interference, Habitat loss, Edaphic factors, Drought	VU
<i>Octonochaeta rosea</i>	Edaphic factors, Human interference, Pesticides, Drought	CR
<i>Ocypoda ceratophthalma</i>	Pollution, Loss of habitat, Human interference	LRnt
<i>Ocypoda cordimana</i>	Pollution, Loss of habitat, Human interference	EN

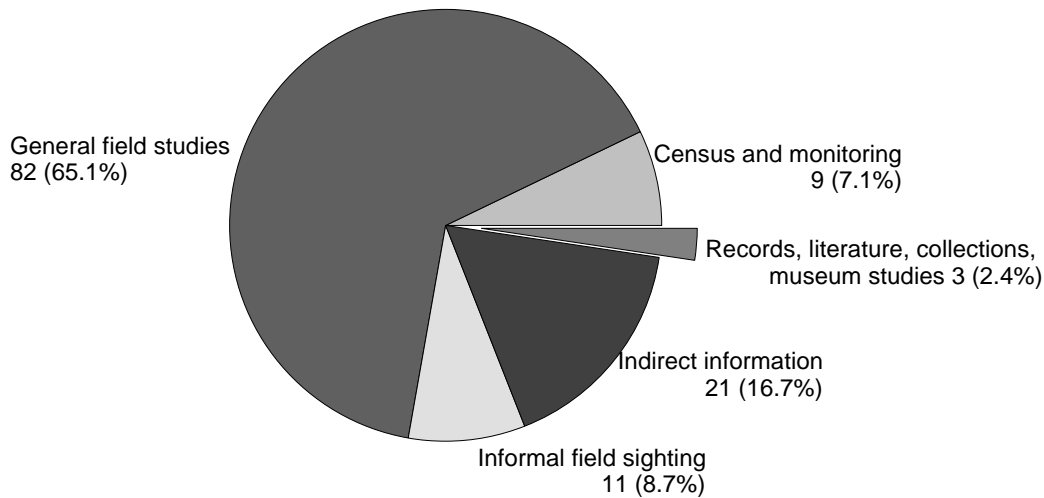


Taxon	Threats	IUCN
<i>Ocypoda macrocera</i>	Pollution, Loss of habitat, Human interference	EN
<i>Ocypoda platytarsis</i>	Pollution, Human interference, Habitat loss, Harvest for food	VU
<i>Odontotermes brunneus</i>	Human interference, Loss of habitat	VU
<i>Odontotermes wallonensis</i>	Loss of habitat through cultivation, Edaphic factors, Pesticides, Loss of habitat due to fragmentation	VU
<i>Oecophylla smaragdina</i>	Harvest for food	LRlc
<i>Paludomus stomatodon</i>	Loss of habitat, Human interference	CR
<i>Paludomus monile</i>	Loss of habitat, Pollution	EN
<i>Paludomus tanschaurica</i>	Loss of habitat, Pollution	VU
<i>Parreysia corrugata</i>	Pollution, Pesticides, Loss of habitat	VU
<i>Perionyx excavatus</i>	Edaphic factors, Loss of habitat	LRnt
<i>Phyllogonostreptus nigrolabiatus</i>	Loss of habitat, Drought	LRnt
<i>Pila globasa</i>	Pollution, Loss of habitat, Pesticides, Human interference, Harvest for food, & Medicine	VU
<i>Pila virens</i>	Loss of habitat, Pesticides, Pollution, Human interference	VU
<i>Plagiolepis jerdonii</i>	No	LRlc
<i>Poecilocerus pictus</i>	Human interference, Collection for Laboratory study	LRlc
<i>Polydrepanum tamilum</i>	Climate, Loss of habitat, Drought	LRlc
<i>Psilacrum convexa</i>	Loss of habitat	CR
<i>Seychalthis importantus</i>	Pollution, Pesticides, Loss of habitat	CR
<i>Speculitermes sinhalensis</i>	Loss of habitat, Loss of habitat due to fragmentation	EN
<i>Strandesia bicornuta</i>	Loss of habitat, Pollution, Human interference	EN
<i>Strandesia elongata</i>	Pollution, Loss of habitat, Human interference	EN
<i>Strandesia flavescens</i>	Pollution, Loss of habitat, Human interference	EN
<i>Strandesia indica</i>	Loss of habitat, Pollution, Human interference	VU
<i>Strandesia labiata</i>	Loss of habitat, Pollution, Human interference	LRnt
<i>Strandesia purpurascens</i>	Loss of habitat, Pollution, Human interference	EN
<i>Streptogenopus jerdoni</i>	Human interference, Drought	EN
<i>Sulcospiral hugeli</i>	Loss of habitat, Pollution	EN
<i>Synectrychotes calimerei</i>	Human interference, Loss of habitat, Grazing	CR
<i>Tetramorium rossi</i>	Not known	DD
<i>Tetraoponera aitkeni</i>	No	LRlc
<i>Thelyphonus sepiaris</i>	Loss of habitat	LRnt
<i>Tricimbomyia muzhiyarensis</i>	Loss of habitat	CR
<i>Trinervitermes bifornis</i>	Loss of habitat, Pesticides	VU
<i>Truxalis indica</i>	Loss of habitat	EN
<i>Valitra neelai</i>	Not known	DD
<i>Viviparus variata</i>	Pollution, Loss of habitat	EN
<i>Xenobolus acuticonus</i>	Climate, Drought	LRnt
<i>Zarytes squalina</i>	Loss of habitat, Human interference	CR

### Data Quality

All taxa considered in this workshop have been assessed with information that was generated from general field studies (85 taxa). A few have been evaluated also based on reliable census (9 taxa), informal field sightings (11 taxa), indirect information (21 taxa) and records or literature (3 taxa).

## Data quality



The IUCN guidelines for assessment clearly suggest a “conservative” approach in favour of the taxa, e.g. “. . . the absence of high quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasized to be acceptable throughout. Inference and projection may be based on extrapolation of current or potential threats into the future (including dependence on other taxa), so factors related to population abundance or distribution (including dependence on other taxa), so long as these can reasonably be supported. Suspected or inferred patterns in either the recent past, present or near future can be based on any of a series of related factors, and these factors should be specified. Taxa at risk from threats posed by future events of low probability but with severe consequences (catastrophes) should be identified by the criteria (e.g. small distribution, few locations). Some threats need to be identified particularly early, and appropriate actions taken, because their effects may be irreversible, or nearly so (pathogens, invasive organisms, hybridization).”

The exercise to determine the status of any taxon should not be hindered by the fact that there is little hard information available. Thorough, all-encompassing hard data is impossible to gather for even a single taxon, and the time required to actually gather such detailed information could delay conservation measures for threatened taxa. The combination of elements which make up a CAMP workshop such as group effort of botanists including field workers, both past and present, museum curators, ecologists, theoreticians, policy makers and related specialists together, good faith and impartial facilitation provide informed advice for conservation action planning. The results of this Workshop are the outcome of such an exercise.

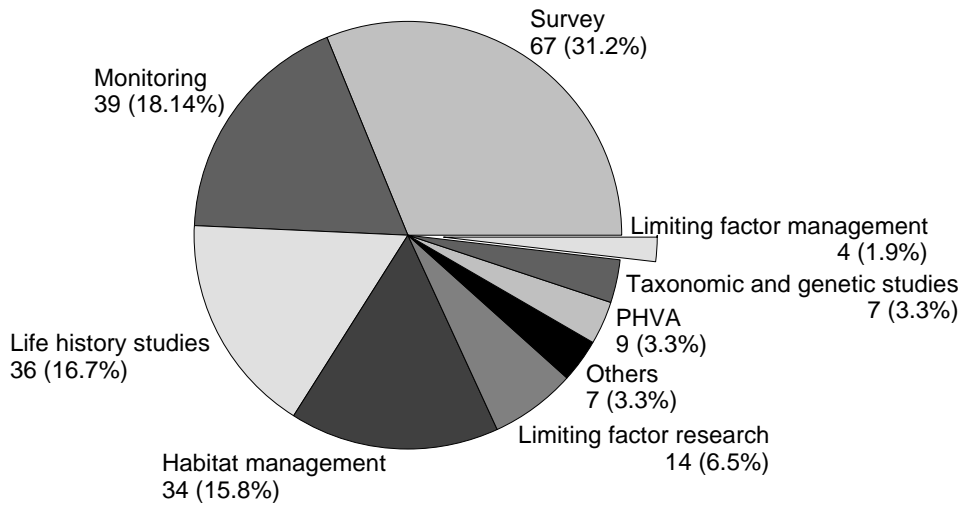
## Conservation action and recommendations

The previous section dealt with the different values for assessing the IUCN categories for the taxa. This section concerns action to be taken to insure that the taxa are conserved in the wild and that their habitat is safe. Conservation action can take many forms, the first of which is keeping the habitat inviolate, which may be the best way of insuring survival of taxa. However, habitat protection alone may not be sufficient. Constant pressure on habitat and individual taxa has forced many taxa into threatened status. This creates other complications such as small and isolated or fragmented populations, which may propel the taxon into an “extinction vortex”. To overcome these complications and possible extinction, remedial actions need to be taken up.

An understanding of the basic biology and behaviour of a taxon can also help in identifying individual areas of conservation action and implementation.

Table 4 shows that since not enough information on actual distribution of the taxa are known and because some have been assessed based on information from old records, a very strong recommendation for survey has been made for this group (67 taxa). Monitoring of populations to see the effects of threats has been recommended for 39 taxa, life history studies for 36 taxa and due to loss of habitat and change in quality of habitat being a primary cause of threat, habitat management has been recommended for 34 taxa. Other recommendations include limiting factor research, taxonomic and morphological genetic studies, limiting factor management, population and habitat viability assessments and others that are taxon specific.

### Research management recommendations



**Table 4. Research recommendations**

	T	S	M	G	H	Hm	Lm	Lr	Lh	P	O
CR	-	16	8	-	-	5	-	4	11	3	-
EN	4	13	8	-	-	12	1	3	7	3	1
VU	1	14	13	-	-	10	2	3	9	1	2
LR-nt	1	16	8	-	-	4	-	2	3	-	2
LR-lc	1	3	5	-	-	3	1	1	3	-	2
DD	-	4	3	-	-	-	-	1	3	-	-
NE	-	1	-	-	-	-	-	-	-	-	-
Total	7	67	45	0	0	34	4	14	36	7	7

### Captive breeding and the level of difficulty

Captive breeding recommendations are at 4 levels, Levels 1, 2, 3 and 4 (see definitions on side panel pull out after the Executive Summary). Level 1 is for taxa to be interactively managed *in situ* and *ex situ* so as to retain 90% genetic diversity for 100 years. Level 2 is for *ex situ* populations to be infused with fresh genetic material from the wild so as to retain sufficient diversity. Level 3 is not for conservation but only for education, husbandry and research. Level 4 is for commercial and sustainable utilisation.

**Table 5. Captive breeding recommendations**

Captive Breeding	Level 1	Level 2	Level 3	Level 4	Pending	No
CR	-	-	4	-	3	9
EN	1	-	4	-	1	15
VU	1	-	4	-	2	12
LRnt	1	-	1	-	1	15
LRlc	-	-	3	-	-	7
DD	-	-	4	-	-	5
NE	-	-	-	-	-	-
Total	3	0	20	0	7	63

In this workshop a few taxa were recommended for captive breeding for education and research and only 3 were recommended for conservation. In India, the concept of captive breeding for conservation is not considered a crucial part of conservation as it is seen as a tool that utilises exploitation of the wild resources. However, given

the rate at which taxa are being threatened with extinction, captive breeding may become the final option for maintaining many species in existence. With respect to some invertebrates, captive breeding for conservation is a viable option because of the ease of maintenance and cost effectiveness. A recent study undertaken by the Coimbatore Zoological Park and Conservation Centre has demonstrated how cost-effective captive breeding of invertebrates can be.

**Table 6. Level of difficulty in breeding invertebrates in captivity**

	Least difficult	Moderately difficult	Very difficult	Unknown	No.
CR	3	0	2	7	4
EN	10	1	5	4	1
VU	9	2	3	8	2
LRnt	13	4	1	2	-
LRlc	6	-	-	3	-
DD	-	1	-	3	-
NE	1	-	-	-	-
Total	42	8	11	27	7

### Rapid Assessment Exercise

Invertebrates are such a large group that assessment of every single species or subspecies is time consuming and expensive. Further, for most invertebrates there is not enough information available that would justify individual assessment. At the workshop, a rapid assessment table for ranking invertebrates as per research priorities was developed and distributed among the participants to fill in their respective group species information. Information required for each species were:

1. Year of description of the species
2. Studies conducted after the species was discovered and described
3. Studies conducted on the species in the last 10 years
4. Endemicity and
5. Present state of the habitat in which the species is/ was found

**Table 7. Rapid assessment table indicating priorities for research and studies within the orders**

Particulars	Mollusc	Milipede	Termite	Ant	Grass hopper
No. of southern Indian species ranked	276	39	99	91	93
No. of species described before 1899	262	4	7	50	67
No. of species described between 1900-1949	6	35	48	35	26
No. of species described after 1950	8	0	44	2	0
Studies of species made after description	276	9	65	Unk	70
Study conducted in the last 10 years	25	20	5	Unk	62
No. of endemic species	0	14	93	Unk	6
Rating for research priority					
High priority	264	27	85	Unk	25
Medium priority	11	8	8	Unk	7
Low priority	0	6	6	Unk	61
Incomplete information	1	7	0	91	0

Based on the above information research priority ratings were assigned to the species. As table 7 indicates, except for grasshoppers, most of the molluscs, millipedes and termites are categorised as high priority. This is directly related to how little is known about the groups and most of the species within the groups. There was no information available on ants in most cases for the above questions. Their high ranking in most cases is due to the fact that they have not been studied since description or there has been no field study in last 10 years.

## Working Group Issues

Special working groups were formed at the workshop to discuss issues that were considered of importance in the context of assessing and conserving invertebrates. Three groups were formed for subjects such as 1. Systematics and population studies of invertebrates, 2. Education and awareness and 3. Logistics of conserving invertebrates. Following the working groups, on the final day of the workshop, participants were asked what they would commit in working towards invertebrate conservation. The working group reports and commitments are presented below.

### Systematics and Population Working Group

Members: D. Rajagopal, R. Natarajan, K. Bano, M.B. Raghunathan, R. Mathew, A.S. Vastrad, K.G. Emyliamma

Some barriers to invertebrate conservation were listed by Dr. B.A. Daniel under the topic of "information". A working group was formed to discuss various information needs under the topic "systematics and population". The working group made the following recommendations to improve the existing situation with regard to invertebrate information requirements:

Information on invertebrates should be collected, stored and disseminated under the headings of Systematic studies and Bio-ecological studies

With regard to Systematic studies, the following aspects would be covered

1. Data on number of species
2. Species description details
3. Taxonomy
4. Nomenclature
5. Synonyms
6. Species level identification

With regard to Systematics, the following recommendations were made

1. Currently available systematics information on various species should be compiled, documented and stored in a central data bank which would be accessible to all invertebrate researchers, and updated regularly with information from ongoing studies.
2. An inventory or checklist for the species should be published periodically (at least once in 10 years).
3. Detailed descriptions should be compiled through existing information. Revision studies on the description of the species may be taken up wherever necessary.
4. Description of species that have been made in other languages should be translated into English and made available.
5. The latest information on taxonomy should be procured from various sources/ authorities and made available to the end users.
6. Types and paratypes should be deposited at Regional Centres of ZSI, Institutes and universities and the information should be made available.
7. New species descriptions should be published only in a particular journal for the benefit of all workers.

Under Bio-ecological studies, the following aspects need be studied to overcome the hurdles that are posed in invertebrate assessments and their management programmes.

1. Knowledge of life history
2. Seasonal variation
3. Role of seasonal forms on the ecosystem
4. Distribution information
5. Population information

6. Biodiversity conservation
7. Bio-ecological studies including life history studies under field and laboratory conditions on soil invertebrates (terrestrial isopods, millipedes, centipedes, Symphyla, Pauropoda, Tardigrada, Arachnida, Diplura, Protura, Collembola, Mollusca, Annelida) other than the better known insect groups should be encouraged and thoroughly studied on priority basis.

### **Education and Awareness Working Group**

Members: R. Bhanumathi, P. Ahimaz, C. Gunasekaran, P.T. Cherian, S. Walker

Invertebrates are a neglected and misunderstood animal group. Large mammals have claimed the major amount of public sympathy and financial support. Also invertebrates have a bad image with people thinking of pests such as mosquitoes and other vectors or “dangerous creatures” such as scorpions and spiders. Consequently, people do not give importance to this largest of all groups of living forms despite its crucial importance. Through education and public awareness, this lacuna can be addressed. There are two major categories for Education and Awareness, the general public and the policy makers.

The following outline was suggested by the Working Group on Education and Awareness:

Public: Target groups are educators, students, press, villagers, general public, voluntary groups (NCC/NSS and other NGOs; educators (schools and colleges).

1. Orientation to invertebrates for educators (schools and colleges) — Workshops, field trips, seminars
2. Students
  - a. School students — Art and craft seminars and workshops, field trips, workshops, exhibitions, small projects
  - b. College students — Field trips, workshops, projects, exhibitions
3. Villages — Discussions, slide/ film/ video shows, exhibitions (including live exhibits), puppet shows
4. General public — Exhibitions, invertebrate section in zoos and museums, mass media (TV - one programme snippet), slide/ video shows
5. Politician / administrators / IAS officers — Discussions and meetings, slide/ video shows
6. Press — Slide/ film/ video shows, interviews with scientists, discussions
7. Voluntary groups — Slide/ film/ video shows, field trips and workshops
8. Business community — Approach industries or agro-industries which are involved in pest control or any insect research to “adopt” a Critically Endangered or Endangered invertebrate and sponsor a field study, education project, or captive programme and make that animal a symbol for their company.

Policy — target groups: bureaucrats, politicians, administrators

1. Ministry of Human Resources Development should be approached for grants for invertebrate education programme
2. Ministry of Education should be approached to make alterations in the existing curriculum to place appropriate emphasis on invertebrate studies.
3. Empower enforcement bodies to effectively enforce existing wildlife rules (IWPA, Forest protection Act, private forest acts and laws, Animal Welfare and PCA Act, Pollution Acts).

Educational materials suggested

1. Posters - all groups
2. Handouts - all groups except villagers
3. Stickers - all groups except villagers
4. Booklets - educators/ students
5. Project booklet (General description/ ideas; art/crafts, games, puzzles, crosswords, riddles, brain teasers, etc.)
6. Arts and Crafts (Finger puppets, glove puppets, paper sculpture, origami, craft from waste)

### **Logistics Working Group**

Members: M.V. Reddy, A.K. Chakravarthy, M. Mary Bai, T.J. Indra, A. Kumar, B.A. Daniel, P.T. Cherian

Barriers to invertebrate conservation: recommendations by logistic group

1. No document is available on survey techniques of invertebrates in a readily compiled form.
2. A sampling plan has to be designed for an area that can be followed in different areas.
3. Pocket guidebook for field survey of soil invertebrates is required.
4. Need to design a statistical method to analyse data available from sampling methods
5. A multidisciplinary team is needed for sampling soil invertebrates
6. No previous data on population estimation is available.
7. Existing invertebrate collections (museum, ZSI, colleges) can be compiled, computerised and made available to researchers
8. Only about 10% of invertebrate taxa are known and this is the major barrier for identification and developing reliable inventories for a given area. This is due to lack of comprehensive information to the extent of non-census of 90% of invertebrate fauna.
9. Paucity of experts on many major invertebrate groups.
10. Disproportionate funding for invertebrate research
11. Non existence of field guides for most of the groups and smallness of the species makes it almost impossible to identify in the field.
12. Experts should be identified and assigned the task of preparing field guide to the maximum possible groups.
13. Periodical training and network group meetings has to be conducted to keep abreast of the taxonomic changes
14. Data on collections of museum specimen and field guides of surveys should be retrieved and computerised.
15. All available methodologies used abroad for invertebrate have to be designed to Indian conditions
16. Functional aspects: Very little information is available on functional aspects (ecological role) of soil invertebrates.
17. Necessary protocol procedure should be established to allow the workers to sample the soil up to 50 cm depth in forests and the forest department should allow to do it.
18. The importance of soil invertebrate conservation starts only from this Soil Invertebrate CAMP workshop
19. For mapping and inventorisation of invertebrate groups
  - i) R.A.P. Method (Rapid Assessment Programme) to investigate quickly poorly-known ecosystems that may be local hot spots.
  - ii) BIOTROP method developed by the University of Kansas, can be adapted for survey inventorisation
  - iii) The approach of InBio programme of Costa Rica commenced in 1989 can be considered for adoption with changes to suit local conditions
  - iv) GAP Analysis. This pattern of GIS may be taken up to map the structure of the ecosystems to estimate populations of species and the conditions in which they thrive.
  - v) Creating Biological Wealth - As species inventories expand they open the way to bioeconomic analysis to assess the economic potential of entire ecosystems. By this we can assign ecosystems their future value.

### **Commitments**

It is a "tradition" in ZOO/CBSG, India workshops to give an opportunity for participants to make personal commitments towards the conservation of the species that have been assessed. It is easy enough to wait for our institutions to act on recommendations and and to complain when "nothing is done". To counter the tendency to let someone else do it, we make commitments for ourselves. Even if no other individual, agency, organisation or institution takes action, "I" can do at least this much. It is a way of requesting people to do

something extra that they may not ordinarily do. The participants of the Conservation Assessment and Management Plan Workshop made the following commitments:

1. Dr. A. Kumar - although he is studying a different animal group, Ajith will provide facilities for invertebrate studies in his research field stations. He will also support research into methodology and try to find funds for publishing a compilation of methodologies.
2. Dr. P.T. Cherian - will organise a training course on some aspect of invertebrate studies. He will also try to organise more CAMP Workshops taking one Order of invertebrates at a time and calling all specialists for that order.
3. Mr. P. Ahimaz - will contribute to creation of awareness programmes on carnivorous invertebrates in particular and invertebrate conservation in general.
4. Dr. B.A. Daniel - will prepare a Directory of Invertebrate Specialists
5. Dr. D. Rajagopal - will deliver lecture on soil invertebrates and their importance and prepare articles about soil fauna if guidelines as to what type of material is wanted. He will also provide identification services for invertebrate researchers for free.
6. Ms. R. Bhanumathi - will create photo/ documentation series for Education & Awareness and will help with any awareness programme.
7. Dr. S. Paulraj - will guide students in his wildlife sanctuary at Dharmapuri, providing funds for projects including studies on invertebrates. He will also provide guidance in making Invertebrate exhibits for individuals and institutions who want to keep invertebrates for education or breeding.
8. Dr. L. Narayana - will provide guidance on identification and study on southern Indian invertebrates
9. Dr. R. Natarajan will train students for Mollusc studies and prepare handbook on methodologies. Elevate Areca Valley to conservation status through education.
10. Dr. M.B. Raghunathan - will write general articles on fresh water soil invertebrates.
11. Mr. C. Gunasekaran - will make educational products for invertebrate awareness
12. Mr. S. Molur – will help with assessments with help from specialists as a precursor to group assessments in CAMP workshops.
13. Ms. S. Walker - will approach managers in pest control industry to adopt invertebrates, fund - educational projects etc.
14. Dr. Mary Bai - will compile notes on collection and preservation of millipedes
15. Dr. M.V. Reddy - will give will deliver lectures on the importance of invertebrates conservation and the role of soil invertebrates and their response to modern agriculture management, and will train students and research scholars for soil invertebrate population studies and prepare a hand book on methodology.

## Conclusion

The BCPP Conservation Assessment and Management Plan Workshop for selected Soil Invertebrates of southern India was a pioneering effort in several ways. For the first time in India, and perhaps anywhere, a systematic conservation workshop was held for a taxon group such as soil invertebrates, which are neither particularly attractive or exciting or in trade. While the total of 64% threatened taxa may not be indicative of all soil invertebrate status, it is useful in demonstrating that even an earthworm can be endangered. The workshop also demonstrated that the revised IUCN categories can be applied to invertebrates, despite some adjustments and difficulties. Problems participants had using the categories were communicated to the Review Working Group of the Species Survival Commission, which benefited by our testing the categories on an unusual group of organisms. Perhaps more important with regard to the IUCN categories, the workshop participants reported that they learned a great deal about conservation biology and population dynamics which would be reflected in the kinds and quality of information they aspired to collect in future field studies.

Several problems of invertebrate research methodology were addressed in the special working groups, as well as the potential for education and awareness regarding invertebrates. A methodology for conducting a rapid assessment of very large numbers of organisms in the same family was developed and can be used for all invertebrate groups whereas it is not possible to conduct detailed assessments for all.



Perhaps the most useful achievement of the workshop was that a model and methodology for confronting the formidable number of described taxa represented in the Indian invertebrate group of organisms. It was necessary first to network soil invertebrate researchers, collect lists and articles from them, select participants for the workshop, provide reference material, conduct the workshop, distribute the draft and organise the information in a useful manner.

Since the CAMP workshop for selected soil invertebrates, a number of requests for CAMP workshops for invertebrates have been received, including Dragonflies, Spiders, Butterflies, and Corals. While it seems an almost impossible task to assess all of invertebrate fauna, the CAMP workshop for soil invertebrates represents a first step and a viable methodology towards achieving that objective.

## Lists of invertebrates ranked by the rapid assessment method

### Ants of southern India

#### Family : Formicidae

##### Subfamily : Formicinae

*Camponotus compressus*  
*Camponotus confucii*  
*Camponotus irritans*  
*Camponotus maculatus*  
*Camponotus mendax*  
*Camponotus nirvanae*  
*Camponotus oblongus*  
*Camponotus radiatus*  
*Camponotus rufoglaucus*  
*Camponotus strictus*  
*Cecophylla smaragdina*  
*Lepisiota fergusonii*  
*Lepisiota opaca*  
*Paratrechina longicornis*  
*Paratrechina yerburyi*  
*Plagiolepis jerdonii*  
*Plagiolepis rogeri*  
*Polyrhachis aculeata*  
*Polyrhachis gracilior*  
*Polyrhachis thrinax*  
*Polyrhachis tibialis*  
*Polyrhachis wroughtonii*

##### Subfamily : Dolchoderinae

*Tapinoma melanocephalum*  
*Technomyrmex albipes*

##### Subfamily : Aenictinae

*Aenictus arya*  
*Aenictus clavatus*  
*Aenictus fergusonii*  
*Aenictus gleadowii*  
*Aenictus pachycerus*  
*Aenictus wroughtonii*

##### Subfamily : Dorylinae

*Dorylus orientalis*

##### Subfamily : Ponerinae

*Amblyopone bellii*  
*Anochetus kanariensis*  
*Anochetus madaraszi*  
*Cerapachys longitarsus*  
*Diacamma rugosum*  
*Harpegnathos saltator*  
*Harpegnathos ventator*  
*Hypoponera confinis*  
*Leptogenys dalyi*  
*Leptogenys dentilobis*  
*Leptogenys minchini*  
*Leptogenys punctiventris*  
*Leptogenys robertis*  
*Odontomachus haematodes*  
*Pachcondyla jerdoni*  
*Pachcondyla luteipes*  
*Pachcondyla annamit*

##### Subfamily : Myrmicinae

*Aphaenogaster beccarii*

*Crematogaster aberrans*  
*Crematogaster biroi*  
*Crematogaster dayli*  
*Crematogaster ebenina*  
*Crematogaster ransonneti*  
*Crematogaster rogenhoferi*  
*Crematogaster subnuda*  
*Crematogaster travancorensis*  
*Lophomyrmex quadrispinosus*  
*Meranoplus bellii*  
*Meranoplus rothneyi*  
*Monomorium criniceps*  
*Monomorium dichroum*  
*Monomorium floricola*  
*Monomorium glabrum*  
*Monomorium indicum*  
*Monomorium latinode*  
*Monomorium monomorium*  
*Monomorium schurri*  
*Oligomyrmex leei*  
*Pheidole constanciae*  
*Pheidole fergusonii*  
*Pheidole mus*  
*Pheidole phipsoni*  
*Pheidole roberti*  
*Pheidole sharpi*  
*Pheidole spathifera*  
*Pheidologeton diversus*  
*Solenopsis geminata*  
*Strumigenys godeffroyi*  
*Tetramorium coonoorensis*  
*Tetramorium decamerum*  
*Tetramorium fergusonii*  
*Tetramorium guineense*  
*Tetramorium inglebyi*  
*Tetramorium mixtum*  
*Tetramorium smithi*  
*Tetramorium tortuosum*

##### Subfamily : Pseudomyrmecinae

*Tetraponera difficilis*  
*Tetraponera nigra*  
*Tetraponera rufonigra*

#### Source:

Bingham, C.T. (1903) *The Fauna of British India*, Vol:2 Today and

Tomorrow Printer's and Publishers, New Delhi.

Bolton, B. (1995) *A new general catalogue of the Ants of the world*. Harvard University Press.

**Rating by** Mrs. Rosamma Mathew, D. Rajagopal and B.A. Daniel at Southern Indian Soil Invertebrate CAMP for BCPP, ZSI, Chennai

## Grasshoppers of southern India

**Order : Orthoptera**

**Family : Acridiidae**

**Subfamily : Acridiinae**

*Abbasia subserrata*  
*Aacathalobus flavopictus*  
*Acrydium bipunctatum*  
*Criotettix exsertus*  
*Criotettix indicus*  
*Criotettix oculus*  
*Criotettix obscurus*  
*Deltonotus gibbiceps*  
*Hancockia portentosa*  
*Hedotettix gracilis*  
*Mazarredia cristulata*  
*Paratettix balteatus*  
*Paratettix indicus*  
*Paratettix scaber*  
*Paratettix variabilis*  
*Scelimena gavialis*  
*Scelimena harpago*  
*Scelimena producta*  
*Systolederus greeni*  
*Tripetalocera ferruginea*

**Subfamily : Eumastacinae**

*Acrida lugubris*  
*Aeolopus affinis*  
*Aeolopus tamulus*  
*Aulacobothrus infernus*  
*Aulacobothrus socius*  
*Aulacobothrus strictus*  
*Aulacobothrus taeniatus*  
*Gymnobothrus indicus*  
*Madurea cephalotes*  
*Mastacides pterolepis*  
*Mastacides pupaeformis*  
*Mastacides vaginalis*  
*Ochrilidia longiceps*  
*Paraphaeoba carinata*  
*Paraphaeoba platyceps*  
*Phlaeoba panteli*  
*Phlaeoba angustidorsis*  
*Phlaeobida angustipennis*  
*Phyllochoreia unicolor*  
*Zygophlaeoba truncaticollis*  
*Zygophlaeoba sinuatocollis*

**Subfamily : Oedipodinae**

*Chlaebora grossa*  
*Dittopternis venusta*  
*Gastrimargus transversus*  
*Lerina cedipodioides*

**Subfamily: Pyrgomorphinae**

*Anarchita aptera*  
*Atractomorpha crenulata*  
*Aularches miliaris*  
*Aularches punctatus*  
*Chrotogonus brachypterus*  
*Chrotogonus oxypterus*  
*Chrotogonus saussurei*  
*Colemania sphenarioides*  
*Orthacris acuticeps*

*Orthacris elegans*  
*Orthacris maindroni*  
*Orthacris ruficornis*  
*Orthacris simulans*  
*Poecilocerus pictus*  
*Poecilocerus tessellatus*  
*Pyrgomorpha bispinosa*  
*Zarytes squalina*

**Subfamily : Catantopinae**

*Bibracte rugulosa*  
*Bibractoides punctoria*  
*Brachyxenia scutifera*  
*Caloptenopsis liturifer*  
*Castetria dispar*  
*Catantops acuticercus*  
*Catantops angustulus*  
*Catantops indicus*  
*Catantops interruptus*  
*Coptacra ensifera*  
*Coptacrella martini*  
*Cyrtacanthacris ranacea*  
*Epistaurus sinetyi*  
*Eucoptacra paremorsa*  
*Eupreopcnemis alacris*  
*Eupreopcnemis pulchra*  
*Euthymia kirbyi*  
*Gelastorrhinus semipictus*  
*Gerania dorsalis*  
*Heteracris capensis*  
*Heteracris illusotris*  
*Leptacris filiformis*  
*Orthacanthacris flavescens*  
*Orthacanthacris nigricornis*  
*Orthacanthacris succincta*  
*Oxya velox*  
*Paraeupreopcnemis pictipes*  
*Pelecinotus brachypterus*  
*Pelecinotus cristagalli*  
*Stenocroblylus femoratus*  
*Tylotropidius varicornis*  
*Xenippa prasina*

**Rating by** A.S. Vastrad at the  
Southern Indian Soil invertebrate  
CAMP for BCPP, ZSI, Chennai

**Source :**

Kirby, W.F. The Fauna of British  
India, Vol. Today and Tomorrow  
Printers and Publishers, New Delhi

## Mollusca of southern India

**Class : Gastropoda**

**Order : Pulmonata**

**Suborder : Stylomatophora**

**Family : Testacellidae**

**Subfamily : Streptaxinae**

*Ennea beddomii*

*Ennea bicolor*

*Ennea canarica*

*Ennea exilis*

*Ennea macrodon*

*Ennea pirriei*

*Ennea planguncula*

*Ennea sculpta*

*Ennea subcostulata*

*Ennea turricula*

*Streptaxis beddomii*

*Streptaxis canarica*

*Streptaxis compressus*

*Streptaxis concinnus*

*Streptaxis footei*

*Streptaxis peroteti*

*Streptaxis personatus*

*Streptaxis pronus*

*Streptaxis scalptus*

*Streptaxis watsoni*

**Family : Zonitidae**

**Subfamily : Ariophantinae**

*Ariophanta kadapaensis*

*Ariophanta thyreus*

*Cryptozona albata*

*Cryptozona basilessa*

*Cryptozona basileus*

*Cryptozona belangeri*

*Cryptozona bistrialis*

*Cryptozona canarica*

*Cryptozona gassii*

*Cryptozona interrupta*

*Cryptozona ligulata*

*Cryptozona maderaspatana*

*Cryptozona semirugata*

*Cryptozona sisparica*

*Cryptozona solata*

*Euplecta acalles*

*Euplecta acuducta*

*Euplecta albizonata*

*Euplecta apicata*

*Euplecta cacuminifera*

*Euplecta granulifera*

*Euplecta indica*

*Euplecta mucosa*

*Euplecta mucronifera*

*Euplecta orbiates*

*Euplecta pulchella*

*Euplecta subcastor*

*Euplecta travancorica*

*Indrela ampulla*

**Subfamily : Macrochlamyinae**

*Macrochlamys peringundensis*

*Macrochlamys hebescens*

*Macrochlamys infausta*

*Macrochlamys pedina*

*Macrochlamys perrotteti*

*Macrochlamys prava*

*Macrochlamys rutila*

*Macrochlamys tenuicula*

*Macrochlamys todarum*

*Macrochlamys vallicola*

*Macrochlamys vilipensa*

*Macrochlamys woodiana*

*Mariaella beddomei*

*Mariaella dussumieri*

*Pseudaustenia atra*

*Pseudaustenia auriformis*

**Subfamily : Durgellinae**

*Durgella levicula*

*Satiella dekhansensis*

*Satiella flexilis*

*Satiella levidensis*

*Satiella pertenuis*

*Sitala balliana*

*Sitala injussa*

*Sitala palmaria*

**Family : Endodontidae**

**Subfamily : Thysanotinae**

*Philalanka bidenticulata*

*Philalanka bolampattiensis*

*Philalanka daghoba*

*Philalanka febrilis*

*Philalanka pirrieana*

*Philalanka quinquelirata*

*Philalanka tertiana*

*Philalanka tricarinata*

*Ruthvenia clathratuloides*

*Ruthvenia retifera*

*Thysanota flavida*

*Thysanota guerini*

*Thysanota tabida*

**Subfamily : Pyramidulinae**

*Pyramidula euomphalus*

**Family : Helicidae**

**Subfamily : Corillinae**

*Corilla anax*

**Subfamily : Camaninae**

*Amphidromus bontiae*

*Amphidromus calcadensis*

*Amphidromus physalis*

*Apatetes bourdilloni*

*Chloritis (Trichochloritis) propinqua*

*Planispira (Trachia) crassicostata*

*Planispira (T.) fallaciosa*

*Planispira (T.) nilagerica*

*Planispira (T.) proxima*

*Planispira (T.) ruginosa*

*Planispira (T.) sordida*

*Planispira (T.) vittata*

**Subfamily : Helicinae**

*Valloina miserrima*

**Family: Enidae**

*Edouardia orbus*

*Ena (Mirus) hanleyana*

*Ena (Mirus) nilagirica*

*Rachisellus bengalensis*

*Rachisellus praetermissus*

*Rachisellus pulcher*

*Rachisellus punctatus*

*Rachisellus trutta*

**Family : Pupillidae**

*Pupilla salemensis*

**Family : Achatinidae**

**Subfamily : Stenogyrinae**

*Opeas gracile*

*Prosoppeas hebes*

**Family : Ferussacidae**

*Glessula anamullica*

*Glessula beddomei*

*Glessula bensoniana*

*Glessula blanda*

*Glessula bollampattiana*

*Glessula botellus*

*Glessula canarica*

*Glessula corrosula*

*Glessula courtallica*

*Glessula deshayesi*

*Glessula facula*

*Glessula fairbanki*

*Glessula filosa*

*Glessula filosa exigua*

*Glessula gracilis*

*Glessula hebes*

*Glessula indica*

*Glessula isis*

*Glessula jerdoni*

*Glessula lyrata*

*Glessula malabarica*

*Glessula mullorum*

*Glessula neglecta*

*Glessula nilagirica*

*Glessula oreas*

*Glessula orophila*

*Glessula paupercula*

*Glessula perrotteti*

*Glessula praelustris*

*Glessula pseudoreas*

*Glessula pusilla*

*Glessula revnelli immitis*

*Glessula senator*

*Glessula shiplayi*

*Glessula sisparica*

*Glessula subfilosa*

*Glessula subinornata*

*Glessula subjerdoni*

*Glessula subperrotteti*

*Glessula subserena*

*Glessula subtornensis*

*Glessula tamulica*

*Glessula tenuitesta*  
*Glessula textilis*  
*Glessula tinnevellica*  
*Glessula tornensis*  
*Glessula travancorica*

**Family: Succiniidae**  
*Succina rugosa*

**Family : Vaginulidae**  
*Vaginulus frauenfeldi*

**Order : Streptoneura**  
**Family : Cyclophoridae**

**Subfamily : Cyclophorinae**

*Craspedotropis cuspidata*  
*Craspedotropis salemensis*  
*Cyathopoma (Cyathopoma) album*  
*Cyathopoma (C.) atrosetosum*  
*Cyathopoma (C.) coonoorensis*  
*Cyathopoma (C.) deccanense*  
*Cyathopoma (C.) filocinctum*  
*Cyathopoma (C.) kalryenense*  
*Cyathopoma (C.) kolamullense*  
*Cyathopoma (C.) latilabra*  
*Cyathopoma (C.) ovatum*  
*Cyathopoma (C.) peilei*  
*Cyathopoma (C.) shevaroyanum*  
*Cyathopoma (C.) sivagherianum*  
*Cyathopoma (C.) travancoricum*  
*Cyathopoma (C.) vitreum*  
*Cyathopoma (C.) wynaadense*  
*Cyathopoma (Jerdonia)*  
*anamallayanum*  
*Cyathopoma (J.) elatum*  
*Cyathopoma (J.) imperforatum*  
*Cyathopoma (J.) malabaricum*  
*Cyathopoma (J.) natalicum*  
*Cyathopoma (J.) trochlea*  
*Cyathopoma (Tortalosa) tortuosa*  
*Cyclophorus (Litostylus) jerdoni*  
*Cyclophorus (L.) muspratti*  
*Cyclophorus (L.) nilagiricus*  
*Cyclophorus indicus*  
*Ditropis beddomei*  
*Ditropis convexa*  
*Ditropis planorbis*  
*Japonia (Lagochilus) malleata*  
*Micraulax coeloconus*  
*Micraulax scabra*  
*Mychopoma hirsutum*  
*Mychopoma limbiferum*  
*Mychopoma seticinatum*  
*Pearsonia (Pseudospiraculum)*  
*beddomei*  
*Pearsonia (P.) fairbanki*  
*Pearsonia (P.) travancorica*  
*Pterocyclus cyclophoroideus*  
*subluteola*  
*Pterocyclus bilabiatus*  
*Pterocyclus comatus*  
*Pterocyclus cyclophoroideus*  
*Pterocyclus nanus*  
*Pterocyclus nanus var. applanata*  
*Pterocyclus nanus var. reflexilabris*  
*Pterocyclus pseudocumingi*

*Theobaldius deplanatus*  
*Theobaldius maculosus*  
*Theobaldius ravidus*  
*Theobaldius shiplayi*  
*Theobaldius stenostoma*  
*Theobaldius stenostoma anguis*  
*Theobaldius tristis*  
*Tortulosa (Dicharax) expatriatus*  
*Tortulosa (Dicharax) footei*  
*Tortulosa (Eucataulus) albescens*  
*Tortulosa (Eucataulus) calcadensis*  
*Tortulosa (Eucataulus) costullata*  
*Tortulosa (Eucataulus) recurvata*  
*Tortulosa (Tortalosa) tortuosa*

**Subfamily : Diplommatinae**

*Cyclotopsis subdiscoidea*  
*Diplommatina (Sinica) subrubella*  
*Diplommatina (D.) minima*  
*Diplommatina (Sinica) canarica*  
*Diplommatina (Sinica) gracilis*  
*Nicida anamullayana*  
*Nicida fairbanki*  
*Nicida kingiana*  
*Nicida liricincta*  
*Nicida nilagirica*  
*Nicida nitidula*  
*Nicida pulneyana*  
*Nicida subovata*  
*Omphalotropis aurantiaca*  
*Opisthostoma deccanense*  
*Opisthostoma distortum*  
*Opisthostoma fairbanki*  
*Opisthostoma macrostoma*  
*Opisthostoma nilgiricum*

**Order: Ostracoda**

*Cypris dravidensis*  
*Cypris protubera*  
*Cypris subglobosa*  
*Eucypris bispinosa*  
*Strandesia bicornata*  
*Strandesia elongata*  
*Strandesia flavescens*  
*Strandesia indica*  
*Strandesia labiata*  
*Strandesia purpurescens*

**Order: Cladocera**

*Ilyocyotes spiser*  
*Macrothris laticornis*

**MOLLUSCA - Additions**

*Bellamyia dissimilis*  
*Bellamyia bengalensis*  
*Billysia stenolbyroides*  
*Corbicula ryulris*  
*Gyraulus commerculus*  
*Gyraulus saigonensis*  
*Indoplassonbis lruslus*  
*Lamellidens marginalis*  
*Lymnaea acuminata*  
*Lymnaea luteola*  
*Melonia (Plotic) seabra*

*Melonia (Striatella) tuberata*  
*Mysorella losligara*  
*Paledomus (Stomateclem )*  
*stomateclem*  
*Paludomus marile*  
*Paludomus tamsehavica*  
*Paludomus monile*  
*Parreysia corugata*  
*Pila globosa*  
*Pila nigrens*  
*Sulurpira hugali*  
*Viviparus vivata*

**Sources :** Gude, G.K. Fauna of British India, Mollusca Vol. 1, Today and Tomorrow Printers and Publishers, New Delhi

Gude, G.K. (1914). Fauna of Fauna of British India, Mollusca Vol. 2, Today and Tomorrow Printers and Publishers, New Delhi

Gude, G.K. (1921). Fauna of British India, Mollusca Vol. 3, Today and tomorrow Printers and Publishers, New Delhi

**Rating by** R. Natarajan and M.B. Ragunathan at Southern Indian Soil Invertebrate CAMP workshop, Chennai

## Termites of southern India

### Family : Kalomotidae

*Cryptotermes domesticus*  
*Cryptotermes dudleyi*  
*Cryptotermes havilandi*  
*Cryptotermes roonwali*  
*Glyptotermes coorgensis*  
*Neotermes assmuthi*  
*Neotermes dhirendrai*  
*Neotermes eleanorae*  
*Neotermes fletcheri*  
*Neotermes keralai*  
*Neotermes krishnai*  
*Neotermes nilamburensis*  
*Neotermes venkateshwara*  
*Postelectrotermes bhimi*  
*Postelectrotermes nayari*  
*Procryptotermes hunsurensis*  
*Procryptotermes dhari*  
*Procryptotermes valeriae*

### Family : Hodotermitidae

#### Subfamily: Hodotermitinae

*Anacanthotermes viarum*

#### Family : Stylotermitidae

*Stylotermes fletcheri*

### Family : Rhinotermitidae

#### Subfamily : Heterotermitinae

*Coptotermes beckeri*  
*Coptotermes ceylonicus*  
*Coptotermes heimi*  
*Heterotermes malabaricus*

#### Subfamily : Prorhinotermitinae

*Prorhinotermes flavus*

### Family : Termitidae

#### Subfamily : Apicotermiteinae

*Euhamitermes dentatus*  
*Euhamitermes indicus*  
*Euhamitermes karnatakensis*  
*Eurytermes budha*  
*Eurytermes topslipensis*  
*Speculitermes deccanensis*  
*Speculitermes dharwarensis*  
*Speculitermes emersoni*  
*Speculitermes goesswaldi*  
*Speculitermes sinhalensis*

#### Subfamily : Termitinae

*Angulitermes acutus*  
*Angulitermes fletcheri*  
*Angulitermes obtusus*  
*Dicuspidermes fletcheri*  
*Dicuspidermes gravelyi*  
*Dicuspidermes incola*  
*Dicuspidermes pername*  
*Dicuspidermes fontanellus*  
*Eremotermes fletcheri*  
*Eremotermes madrasicus*

*Eremotermes paradoxalis*  
*Homaloteremes pilosus*  
*Labiocapritermes distortus*  
*Microcerotermes cameroni*  
*Microcerotermes fletcheri*  
*Microcerotermes ganeshi*  
*Microcerotermes heimi*  
*Microcerotermes minor*  
*Pericapritermes topslipensis*  
*Pericapritermes ceylonicus*  
*Procapritermes fontanellus*  
*Procapritermes goanicus*

#### Subfamily : Macrotermitinae

*Hypotermes obscuriceps*  
*Macrotermes convulsioniarius*  
*Macrotermes estherae*  
*Microtermes globicola*  
*Microtermes obesi*  
*Odontotermes bellahunisensis*  
*Odontotermes anamallensis*  
*Odontotermes assmuthi*  
*Odontotermes brunneus*  
*Odontotermes ceylonicus*  
*Odontotermes distans*  
*Odontotermes feae*  
*Odontotermes feaeoides*  
*Odontotermes horni*  
*Odontotermes kulkarnii*  
*Odontotermes mathadi*  
*Odontotermes obesus*  
*Odontotermes redemanni*  
*Odontotermes roonwali*  
*Odontotermes vaishnol*  
*Odontotermes wallonensis*

#### Subfamily : Nasutitermitinae

*Alstonitermes flavescens*  
*Ampoulitermes wynaadensis*  
*Ceylonitermes indicola*  
*Emersonitermes thekadensis*  
*Grallatotermes grallatoriformis*  
*Grallatotermes niger*  
*Hospitalitermes madrasi*  
*Nasutitermes anamaliaiensis*  
*Nasutitermes beckeri*  
*Nasutitermes brunneus*  
*Nasutitermes crassicornis*  
*Nasutitermes fletcheri*  
*Nasutitermes indicola*  
*Nasutitermes salemensis*  
*Nasutitermes vishnu*  
*Nasutitermes processionarius*  
*Trinervitermes biformis*  
*Trinervitermes fletcheri*  
*Trinervitermes heimi*  
*Trinervitermes nigriostriis*  
*Trinervitermes sensarmai*

#### Source :

Bose, G. (1984). Termite Fauna of Southern India. Records of

Zoological Society of India,  
Calcutta.

**Rating by** Dr. D. Rajagopal and  
Mrs. Rosamma Mathew at Southern  
Indian Soil invertebrate CAMP for  
BCPP, ZSI, Chennai

### Millipides of India

**Source:** Bano, K., (1996). Records of Paradoxomatid Millipedes of India. *In:* Acta Myriapodologia, Geoffery

J.J., Mauries, J.P & Nguyen Duy - Jacquemin, M. (eds) *Mem. Mus. natn. Hist. nat.* 169: 73 - 74.

**Rating by** Dr. (Mrs.) Kubra Bano at Southern Indian Soil Invertebrate CAMP Workshop at Chennai

#### Family : Paradoxomatidae

*Anoplodesmus anthrancinus*  
*Anoplodesmus atopus*  
*Anoplodesmus indus*  
*Anoplodesmus insignis*  
*Anoplodesmus saussurii*  
*Anoplodesmus tanjoricus*  
*Antichirogonus hirtus*  
*Antichirogonus laevisulcatus*  
*Chondromorpha kaimura*  
*Chondromorpha kelaarti*  
*Chondromorpha kelaarti longipes*  
*Chondromorpha kelaarti valparaiensis*  
*Chondromorpha mammifera*  
*Chondromorpha severini*  
*Chondromorpha severini var. robusti*  
*Dasypharkis pumila*  
*Dasypharkis rugulosa*  
*Gyrobrepanum bimontanum*  
*Gyrodrepanum contortipes*  
*Harpogomorpha dentata*  
*Himantogonus rufocinctus*  
*Hindomorpha granulifera*  
*Kaschmiriosama contortipes*  
*Kaschmiriosama nulla*  
*Orthomorpha almorensis*  
*Paranedyopus ursula*  
*Paranedyopus subcylindricus*  
*Parchondromorpha coonoorensis*  
*Polydrepanum asperrimum*  
*Polydrepanum implicatum*  
*Polydrepanum tamilum*  
*Streptogonopus jerdoni*  
*Streptogonopus nitens*  
*Streptogonopus phipsoni*  
*Sundanina septentrionalis*  
*Sundanina trifida*  
*Telodrepanum badaga*  
*Xiphidiogonus hendersoni*  
*Xiphidiogonus dravidus*  
*Xiphidiogonus spinipleurus*

## The IUCN categories and definitions to the Taxon Data Sheet

The Final version of the IUCN Red List Categories (December 1994) has evolved from inputs from specialists in different groups of taxa all over the world. Red List Categories were first introduced in the early 70s and only in 1991 a reevaluation of the categories was done by Georgina Mace and Russell Lande which was called Version 1. For the first time a quantitative approach was introduced in assessing mammalian taxa. Version 2 and later versions attempted the approach of quantification for assessment for all groups of taxa except microorganisms. Non-threatened categories were also introduced during that iteration of the IUCN categories. The present version has been distinctly classified into threatened categories and non-threatened categories and a set of guidelines and criteria help in assessing the threat status of any taxa. The structure of the categories is given in Figure 1 of the Report.

The IUCN categories also give the option of assigning a taxon that is not endangered to a non-threatened category. The non-threatened categories are termed Lower Risk -near threatened, Lower Risk -least concern and Lower Risk -conservation dependent (see definitions of IUCN categories).

Definitions of the categories :

(These definitions are taken from the IUCN Guidelines for the Revised IUCN Red List Criteria but the examples have been added for this Report.)

### EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that its last individual has died.

### EXTINCT IN THE WILD (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity, or as a naturalized population (or population) well outside the past range.

### CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future as defined by the criteria listed in Table 1. An example of a Critically Endangered soil invertebrate from the present Report is *Zarytes squalina* which has been classified as such because it is restricted in its distribution, fragmented and declining due to change in its quality of habitat, area and extent of occurrence.

### ENDANGERED (EN)

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined in the criteria listed in Table 1. The species *Alstonitermis flavescens* is endangered and has been categorised as such because of its restricted distribution, fragmentation and declining due to change in its quality of habitat, area and extent of occurrence and also due to population reduction of more than 50% over the last 10 years.

### VULNERABLE (VU)

A taxon is Vulnerable when it is not Critical or Endangered but is facing a high risk of extinction in the wild in the medium term future, as defined by the criteria listed in Table 1. An example of a species that is Vulnerable is *Heterometrus malapuramensis* because restricted in its distribution, fragmentation and change in its quality of habitat, area and extent of occurrence. It is also assessed as Vulnerable due to reduction in population of over 20% in 10 years in the wild.

**LOWER RISK (LR)** A taxon is Lower Risk when it has been evaluated and does not qualify for any of the above categories -- Critically Endangered, Endangered, Vulnerable -- and is not Data Deficient. There are to sub-categories for Lower Risk which will be explained below

#### LOWER RISK -conservation dependent (LRcd)

Taxa which do not currently qualify under any of the categories above may be classified as conservation dependent. To be considered conservation dependent, a taxon must be the focus of a continuing taxon-specific or habitat-specific conservation program which directly affects the taxon in question. The cessation of this program would result in the taxon qualifying for one of the threatened categories above. There was no species assessed as LRcd in this workshop.

#### LOWER RISK -near threatened (LRnt)

A taxon is near threatened when it is not Critically Endangered, Endangered, or Vulnerable but is, none-the-less, felt to be facing a risk of being threatened. Species example: *Polydrepanum tamilum*



#### LOWER RISK -least concern (LRlc)

A taxon is considered of least concern when it is not threatened, conservation dependent or near threatened. An example of a soil invertebrate classified as least concern is *Mesobuthus hendersoni*.

#### DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information for making a direct, or indirect, assessment of its risk of extinction based on its distribution and/ or population status. Example: *Meranoplus bellii*.

NOT EVALUATED (NE) A taxon is Not Evaluated when it has not yet been assessed against the criteria for some reason. An example of a soil invertebrate that was initially assessed and later categorised as Not Evaluated because of taxonomic and identification problems is *Lymnaea acuminata*.

#### Application of the IUCN categories

The IUCN categories can be applied at three levels, viz. Global, Regional and National.

Global assessment: This term is used when applying the IUCN categories to a taxon in its entire distributional range. In this sense, "global" does not mean that the assessment is being made to a taxon with a "world-wide" or global distribution. For example, *Isometrus brachycentrus* has a very limited distribution, found only in the Western Ghats, which is the "global distribution" of the species. Therefore, it has been assessed at the Global level in this workshop.

The IUCN categories work best at the Global level. This is tantamount to saying that the IUCN categories can be applied best to political endemics. Political endemics are endemics that do not have a distribution across political boundaries, that is, between nations.

Regional assessment: The term Regional Assessment means applying the IUCN categories to a taxon in part of its distributional range. For example, *Macrothrix laticornis* is distributed all over India and the world. In the present CAMP workshop, this species has been assessed only for its distribution in southern India and was not assessed in rest of India. *Macrothrix laticornis* has been assessed at the Regional level, which works well in case of a taxon with a wide distribution in India. A regional assessment, by deriving the status of the taxon for a region, which may differ from other regions in which it is found, thereby facilitates conservation activities, which can be implemented more appropriately over a smaller area.

National assessment: The term National Assessment means applying the IUCN categories to a taxon with respect to its distributional range throughout India. The present categories cannot be applied to taxa at the National level without undertaking many complex exercises. Factors such as distributional range in the neighbouring countries also needs to be known since the guidelines for categorisation at the National level takes into consideration migration of the taxon across political boundaries. Also, it is required to understand the life history of the taxa to be able to qualify for any of the criteria of Restricted Distribution, Population Estimates and Number of Mature Individuals. The exercise of a National Assessment can be undertaken only in the presence of experts with species knowledge from all the countries throughout which the taxon is distributed.

But in this workshop, many taxa have been assigned IUCN categories based on National Assessment. This is because the taxa have been assessed for their complete distributional range in India and for a comprehensive National Action Plan, the assessment has been classified so.

The IUCN categories work best when applied to political endemics, as distribution range does not pose problems for assessment. Assessments for all endemics taxa (6) have been made at the Global level. The remaining non-endemic taxa (69) have been assessed Regionally for northwestern India, for northeastern India or for central India, or Nationally for the taxon's complete distributional range in India. They are denoted by the letter "R" or "N", respectively, following the IUCN category. Regional and National categorisations have been made for non-endemics for the reason that the workshop is only for southern Indian soil invertebrates and that many species southern India have a distribution that crosses political boundaries (e.g species of the old biogeographical regime of Western Ghats and Sri Lanka). Taxa with distribution with political boundary such as between India and Sri Lanka have been assessed at the National level even though there is no knowledge of the population distribution of the taxa in Sri Lanka. Similarly, taxa distributed in mainland India and the Andaman and Nicobar Islands are also categorised regionally for mainland India only since the mandate of the workshop is southern Indian soil invertebrates.

#### Criteria

The threatened categories of the IUCN Red List — Critically Endangered, Endangered and Vulnerable are derived based on 5 criteria (See Guidelines for Criteria for threat categories end of this report), viz:

A. Population reduction (PR)

- B. Restricted distribution (either extent of occurrence or area of occupancy) (RD)
- C. Population number, restricted distribution and fluctuation (PE)
- D. Adult population numbers (Mature individuals) or restricted population (RP)
- E. Probability of extinction (PX)

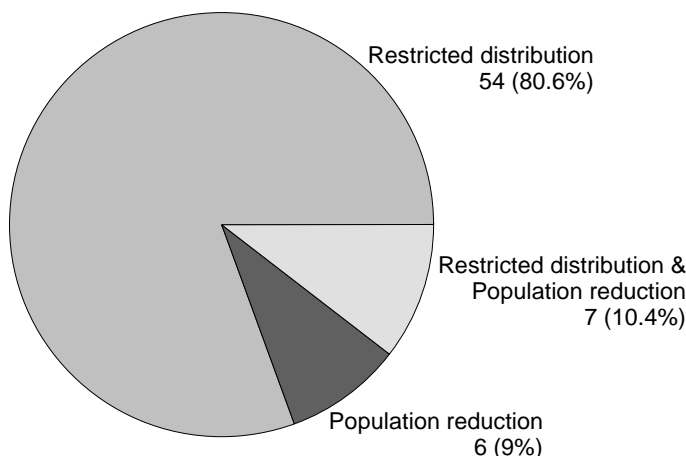
The subcriteria within each of the above criteria vary to determine if a taxon is Critically Endangered, Endangered or Vulnerable. While assigning a threat category to a taxon, the criteria that the threat is based on is also given.

### Population Reduction

Population reduction is not easy to estimate since it involves also estimation of loss of habitat and various threats affecting the population. Information from direct observation is the best source but in many cases there are no population monitoring studies and precise figures are difficult to derive. Therefore educated estimates with good reasoning is also encouraged to derive this information (See IUCN Guidelines under section Data Quality). For threatened categories, the minimum percent decline in population is 20% over 3 generations or 10 years whichever is longer. Depending on the rate of decline, the taxon is assigned a threat category (see IUCN categories chart end of this report).

In the soil invertebrate workshop, only 13 taxa of the threatened taxa have been assessed based on population trends. Of this 7 taxa are also assessed based on the Restricted Distribution criteria.

### Criteria used in categorisation



### Restricted Distribution

As per IUCN guidelines for Restricted Distribution (see definitions for Taxon Data Sheets) a taxon is assessed as threatened if it has a restricted distribution. To meet this criterion the taxa also has to qualify two of the three subcriteria (see IUCN categories chart end of this report). Restricted distribution as per IUCN is less than 20,000 sq.km. for the Extent of Occurrence and/ or less than 2,000 sq.km. for the Area of Occupancy of the taxa. Distribution information was available at the workshop to assess 54 taxa as threatened based on this criteria which includes the 7 taxa that were assessed along with population decline.

### Number of locations

This subcriteria is important to know if the taxon is assessed according to the "Extent of occurrence" criteria. Any taxon distributed in less than 10 locations would qualify for a limited location distribution which would qualify it for the threatened subcriteria. Depending on the number of locations below 10, the taxon would qualify for one subcriteria under Vulnerable, Endangered or Critically Endangered categories (see IUCN guidelines end of report)

If for any taxon, the number of locations is more than ten, then the question of whether the locations are fragmented or not becomes important. According to the guidelines, a population is fragmented from the other if there is no movement of genetic material between the populations. In most cases for plants it is difficult to assess what would be the critical distance for fragmentation. Information of number of locations is purely on the

participants' judgement and their view of the soil invertebrate biology and migration capability. In certain cases the concept of fragmentation is very clear while not so in others.

### **Number of Mature Individuals**

As per IUCN guidelines for the Number of Mature Individuals (see definitions for Taxon Data Sheets) a taxon is assessed as threatened if it has less than 1,000 mature individuals. Depending on the number, the degree of threat will be assigned.

It is always very difficult to estimate the number of mature individuals especially if the taxon is small and has a short generation time. In this CAMP no invertebrate was assessed based on the number of mature individuals

### **Data Quality**

Assessments cannot be relied upon if there is no proper methodology or facts. It is therefore important to provide an authenticated account with the results. Data Quality is of six types, viz.

- a) Reliable census or monitoring
- b) General field study
- c) Informal field sighting
- d) Indirect information (from trade, local experts, practitioners, etc)
- e) Herbarium/ museum/ literature/ collection records
- f) Hearsay/ popular beliefs

### **Research recommendations**

Research recommendations for most of the taxa are made based on the amount of information available and the need for understanding and managing the taxa in the wild. This is part of the conservation action plan that the group derives after the assessment of every taxon. The recommendations are:

- a) Survey (S)
- b) Monitoring (M)
- c) Taxonomic and morphological genetic studies (T)
- d) Genetic management (G)
- e) Husbandry research (H)
- f) Habitat management (Hm)
- g) Limiting factor research (Lr)
- h) Limiting factor management (Lm)
- i) Life history studies (Lh) and
- j) Other taxon specific recommendations (O)
- k) Population and Habitat Viability Assessment

Recommendations also include *ex situ* management and action plan along with *in situ* conservation. This includes different levels such as:

- a) Level 1: Cultivation for metapopulation management by maintaining 90% heterozygosity for 100 years by supplementing individuals or genetic material from captivity into the wild.
- b) Level 2: For maintaining healthy genetic material in cultivation by required input from the wild.
- c) Level 3: Cultivation not for conservation but for either research, education or husbandry.
- d) Level 4: Cultivation for either of the above and for sustainable utilisation.
- e) Pending: Cultivation pending further input from research or scientists.
- f) No: Cultivation not recommended.

### **Level of difficulty**

This is an indicator of whether cultivation is known, partly known or unknown for any taxon that is recommended for cultivation

- a) Level 1 -- Least difficult: Cultivation techniques completely known for either the taxon or similar taxon.
- b) Level 2 – Moderately difficult: Cultivation techniques only partially in place for the taxon or similar taxon.
- c) Level 3 – Very difficult: Cultivation techniques not known for the taxon or similar taxa.
- d) Not known: Information about the level of difficulty not known by the assessors.

**Selected Soil Invertebrates of Southern India**

**Taxon Data Sheets**

## TAXON DATA SHEETS

### Selected soil invertebrates of southern India

**1. *Acanthaspis alagiriensis* Livingstone & Murugan, 1994 -- CR (B1, 2c) -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Underneath stones. **Habitat:** Moist deciduous forest. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India (Tamil Nadu). - **Elevation:** 300m. - **Range (sq. km):** <100. - **Area Occupied (sq. km):** <10. - **Number of locations:** 1 (Alagiri Hills). **Population Trends:** - % Decline: Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** Census & monitoring studies (C. Murugan & D. Livingstone 1983 -88 in Alagiri Hills). **Recent Field Studies:** None. **Threats:** Human interference. **Trade:** No. **Other Comments:** Temple activity at the foothills & higher elevation; Continuous surveys yielded no specimen. **Status- IUCN:** CRITICALLY ENDANGERED. - **Criteria based on:** B1, 2c (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Life history studies; Monitoring. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** Level 3. - **Level of difficulty:** Not known. **Existing Captive Programmes:** No. - **Names of facilities**— **Sources:** Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliolate Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C. and Livingstone, D (1994) Two new species of *Acanthaspis* Amyot and Serville (Heteroptera : Reduviidae : Acanthaspidinae) from the Western Ghats in Tamil Nadu, India. *J. Insect.Sci.* 7(2): 178 -180. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G. Emiliyamma, B.A. Daniel.

**2. *Acanthaspis carinata* Murugan & Livingstone, 1994 -- CR (B1, 2c) -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Underneath stones. **Habitat:** Scrub jungle. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Tamil Nadu. - **Elevation:** 500 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 1 (Foot hills of Maruthamalai, Coimbatore district.). **Population Trends:** - % Decline: Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** Reliable census; General field studies (C. Murugan and D. Livingstone, 1985) in Maruthamalai). **Recent Field Studies:** Murugan, G. & D. Livingstone. **Threats:** Human Interference (man made fire); Loss of Habitat. **Trade:** No. **Other Comments:** Subsequent visits & survey to the site periodically did not yield specimen. **Status- IUCN:** CRITICALLY ENDANGERED. - **Criteria based on:** B1, 2c (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** **Research management:** Survey; Life history; Habitat management. - **PHVA:** No. **Captive Breeding Recommendation:** --. - **Captive breeding:** No. - **Level of difficulty:** No. **Existing Captive Programmes:** No. - **Names of facilities:** --. **Sources:** Murugan C. (1988) Biosystematics and Ecophysiology of the Tibiaroliolate Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1994) Two new species of *Acanthaspis* Amyot and Serville (Heteroptera : Reduviidae : Acanthaspidinae) from the Western Ghats in Tamil Nadu, India. *J.Insect.Sci.* 7(2): 178 -180. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G. Emiliyamma, B.A. Daniel.

**3. *Acanthaspis minutum* Livingstone & Murugan, 1988 -- VU (D2) -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Underneath stones. **Habitat:** Semi arid. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 200 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 1(Nagarjuna Sagar dam, Andhra Pradesh). **Population Trends:** - % Decline: Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** General field study (Murugan, C and D. Livingstone, 1985). **Recent Field Studies:** No. **Threats:** Not known. **Trade:** No. **Other Comments:** Collected close to the dam. **Status- IUCN:** VULNERABLE. - **Criteria based on:** D2 (Population restricted to less than 100km<sup>2</sup>, area of occupancy in a single location). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** **Research management:** Survey; Life history studies. - **PHVA:** —. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** No. **Existing Captive Programmes:** Nil. - **Names of facilities**— **Sources:** Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliolate Assassin Bugs (Heteroptera : Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1988) Three new species of *Acanthaspis* Amy. and Serv. from Southern India (Heteroptera : Reduviidae : Acanthaspidinae). *J. Bombay nat. Hist. Society* 85(1): 170-175. . **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G. Emiliyamma, B.A. Daniel.

**4. *Acanthaspis nigripes* Livingstone & Murugan, 1988 -- VU (D2) -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Under boulders. **Habitat:** Scrub jungle. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Tamil Nadu. - **Elevation:** 1000 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 1(Yelagiri Hills in North Arcor, Ambedkar Dist.) . **Population Trends:** - % Decline: Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** General field study (Murugan and Livingstone, 1984 in Yelagiri Hills). **Recent Field Studies:** None. **Threats:** Loss of habitat; Human interference. **Trade:** No. **Other Comments:** Deforestation activities were in progress when collected. **Status- IUCN:** VULNERABLE. - **Criteria based on:** D2 (Population restricted to less than 100km<sup>2</sup>, area of occupancy in single location). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** **Research management:** Survey; Life history studies. - **PHVA:** No. **Captive Breeding Recommendation:** --. - **Captive breeding:** Level 3. - **Level of difficulty:** Not known. **Existing Captive Programmes:** No. - **Names of facilities**— **Sources:** Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliolate Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1988) Three new species of *Acanthaspis* Amy. and Serv. from Southern India (Heteroptera : Reduviidae : Acanthaspidinae).

*J. Bombay nat. Hist. Society* 85(1): 170 -175. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G.Emiliyamma, B.A. Daniel.

**5. *Acanthaspis pedestris* Stal, 1863 -- LRnt -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Under stones, Entomophagous. **Habitat:** Semi -arid zone (Scrub jungle). **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribtuion:** Southern India. **Elevation:** 50 -500 m. **Range (sq. km):** > 20,000. **Area Occupied (sq. km):** > 2,000. **Number of locations:** > 20 ( Aliyar, Anaikatti, Periyakalendai (Pollachi), Mettupalayam, Madukarai, Kalakkad, Servalar, Maruthuvamalai (Kanyakumari dist.) etc.). **Population Trends:** - % **Decline:** 20% (Projected decline > 10%). **Time / Rate (Yrs or gens):** 20 years (over the next 10 years). **No. of Mature Individuals:** Not known. **Global Population:** Decline in population. **Data Quality:** Reliable censuses or population monitoring; General field study; Informal field sightings. **Recent Field Studies:** D. Livingstone, C. Murugan, D. Ambrose & G. Ravichandran; 1976 onwards in all the above locations. **Threats:** Loss of Habitat; Decline in prey species; Human interference. **Trade:** No. **Other Comments:** Dependent on ants, Aggressive predators. Mortality high in egg stage. Installment hatching -adaption to tide over predatory behaviour. Estimation of mature individual by census and monitoring. **Status- IUCN:** LOWER RISK - NEAR THREATENED- **Criteria based on:** Not applicable. **CITES:** No. **IWPA (1972; 91):** No. **RDB, National (old cat.):** No. **RDB, International (old cat.):** No. **Recommendations:** **Research management:** Habitat management. **PHVA:** No. **Captive Breeding Recommendation:** --. **Captive breeding:** No. **Level of difficulty:** Least difficult. **Existing Captive Programmes:** For experimental purposes - Behavioural studies. **Names of facilities:** Madras Christian College, Dept. of Zoology, Division of Entomology; . St. Xaviers College, Entomology Research Unit, Dept. of Zoology, Palayamkottai. **Sources:** Distant, W.L (1904) *Fauna of British India, including Ceylon and Burma. Rhynchota IV. Heteroptera.* Taylor and Francis London. p272. Ambrose D. P. (1980) Bioecology, Ecophysiology and Ethology of Reduviids (Heteroptera) of the scrub jungles of Tamil Nadu, India. Ph. D. thesis, P.G.Centre, Madras University, Coimbatore. Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliolate Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Ravichandran, G.(1988) Biosystematics and Ecophysiology of the Nontibiaroliolate Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G. Emiliyamma, B.A. Daniel.

**6. *Acanthaspis siruvanii* Livingstone & Murugan, 1988 -- VU (D2) -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Predators on ants and termites. **Habitat:** Underneath stones; Tropical rain forests. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribtuion:** Southern India. **Elevation:** 450 m. **Range (sq. km):** < 100. **Area Occupied (sq. km):** < 10. **Number of locations:** 1 (Siruvani, Tamil Nadu). **Population Trends:** - % **Decline:** Not known. **Time / Rate (Yrs or gens):** Not known. **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** General field study (C. Murugan, G. Ravichandran and D. Livingstone, 1985 in Siruvani). **Recent Field Studies:** Murugan, 1994 in Siruvani. **Threats:** No. **Trade:** No. **Other Comments:** —. **Status- IUCN:** VULNERABLE. **Criteria based on:** D2 (Population restricted to less than 100km<sup>2</sup>, area of occupancy in single location). **CITES:** No. **IWPA (1972; 91):** No. **RDB, National (old cat.):** No. **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Life history study; Monitoring. **PHVA:** No. **Captive Breeding Recommendation:** . **Captive breeding:** No. **Level of difficulty:** Not known. **Existing Captive Programmes:** No. **Names of facilities:**— **Sources:** Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliolate Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1988) Three new species of *Acanthaspis* Amy. and Serv. from Southern India (Heteroptera : Reduviidae : Acanthaspidinae). *J. Bombay nat. Hist. Society* 85(1): 170 -175. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G.Emiliyamma, B.A. Daniel.

**7. *Alstonitermes flavescens* Thakur -- EN (A1a, 1c; B1, 2a, 2b, 2c) -- Order /Family:** Isoptera / Termitidae. **Taxonomic status:** Species. **Habit:** Detritus, leaf litter. **Habitat:** Arboreal (tree dwelling) in evergreen tropical forests. **Global Distribution:** ENDEMIC to the Western Ghats (heavy rainfall area of evergreen tropical forests). **Current Regional Distribtuion:** Western Ghats. **Elevation:** 500 to 2,000 m. **Range (sq. km):** < 5,000. **Area Occupied (sq. km):** < 500. **Number of locations:** 2 -3; Fragmented. **Population Trends:** - % **Decline:** 50%. **Time / Rate (Yrs or gens):** 10 years. **No. of Mature Individuals:** Not known. **Global Population:** Continuing decline observed. **Data Quality:** General field study (D. Rajagopal, 1977-86; M.L. Thakur, 1975); Indirect information. **Recent Field Studies:** None. **Threats:** Pesticides; Loss of habitat. **Trade:** No. **Other Comments:** Builds nests using fecal pellets; nests globular in shape on endemic tree species which mostly serve as shade trees in coffee estates. Sensitive to habitat changes and population fluctuation. Nest size is very small. **Status- IUCN:** ENDANGERED. **Criteria based on:** A1a, 1c (Population reduction observed due to continuing decline in area, extent of occurrence and /or quality of habitat); B1, 2a, 2b, 2c (Restricted distribution, severely fragmented, continuing decline in extent of occurrence, area of occupancy and quality of habitat). **CITES:** No. **IWPA (1972; 91):** No. **RDB, National (old cat.):** No. **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Habitat management; Limiting factor research. **PHVA:** Yes. **Captive Breeding Recommendation:** - **Captive breeding:** Level 1. **Level of difficulty:** Very difficult. **Existing Captive Programmes:** No. **Names of facilities:**— **Sources:** Personal observation/ comments: D. Rajagopal, . Bose, G. (1984) *Termite fauna of southern India.* Records of ZSI, Calcutta. Rajagopal, D. (1983) Habit and habitat studies of some termites from Karnataka, *J. Soil Biol.Ecol.* 3(2): 108-121. Thakur, M.L. (1975) A new native termite from South India (Isoptera: Termitidae: Nasutitermitinae) *J. Bombay nat. Hist. Soc.* 72(3): 781-785. **Compilers:** D. Rajagopal, A.K. Chakravarthy, A.S. Vastrad, B.A. Daniel, R. Mathew.

**8. *Amblyopone bellii* Forel -- DD -- Order/ Family:** Hymenoptera / Formicidae. **Taxonomic status:** Species. **Habit:** Not known. **Habitat:** Subterranean red soil. **Global Distribution:** Not known. **Current Regional Distribtuion:** Southern India, Sriperambadur. **Elevation:** up to 2,000 m. **Range (sq. km):** > 20,000. **Area Occupied (sq. km):** < 10. **Number of locations:** 1. **Population Trends:** - % **Decline:** Not known. **Time / Rate (Yrs or gens):** Not known. **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Highly restricted area of occupancy. **Population Trends:** not known. **Data Quality:** Informal sighting. **Recent Field Studies:** None. **Threats:** Not known. **Trade:**

Not known. **Other Comments:** Primitive ant; Single individual collected from Sriperambadur. Sighted on two or three occasions elsewhere (Northeast). **Status- IUCN: DATA DEFICIENT.** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations: Research management:** Survey; Monitoring; Life history studies; Limiting factor research. - **PHVA:** Pending. Captive breeding Recommendation. - **Captive breeding:** Level 3. - **Level of difficulty:** Not known. Existing Captive Programms: None. - **Names of facilities:** —. **Sources:** Bingham, C.T. (1903) *Fauna of British India including Ceylon and Burma.* . *Hymenoptera* 2. Ants and Cuckoo-wasps, 506 pp, London. . Bolton, B. (1995) *A New General Catalogue of the Ants of the World*, Harvard University Press. **Compilers:** R. Mathew, A.K. Chakravarthy, D. Rajagopal, A.S. Vastrad, B.A. Daniel, . K.G. Emiliamma.

**9. *Aularchis miliaris* -- LRnt -- Order /Family:** Orthoptera / Pyrgomorphidae. **Taxonomic status:** Species. **Habit:** Phytophagous. **Habitat:** Coffee plantations, phytophilous. **Global Distribution:** Most probably in S.E. Asia (Pakistan, Nepal, Tibet, Bangladesh, Vietnam, Thailand, Indonesia, Malaysia, Myanmar). **Current Regional Distribtuion:** Southern India. - **Elevation:** 1,000 m and above. - **Range (sq. km):** > 20,000 . - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - % Decline: Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** May be declining. **Data Quality:** Indirect information; informal field studies. **Recent Field Studies:** Informal sighting by Ranjit Daniels. **Threats:** Pesticides. **Trade:** No. **Other Comments:** Found in high-altitude area. **Status- IUCN: LOWER RISK -NEAR THREATENED (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations: - Research management:** Life history studies . - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programms:** -. - **Names of facilities:** None. **Sources:** COPR (1982). *The locust and grasshopper Agricultural Manual* Centre for overseas pest research, London. **Compilers:** A.S. Vastrad, R.J.R. Daniels, P.T. Cherian, K.V. Lakshminarayana, R. Mathew, . B.A. Daniel, C. Gunasekaran.

**10. *Bellamya bengalensis* -- LRnt -- (*Viviparus bengalensis* ).** (Pond snail; Banded pond snail) **Order /Family:** Megagastropoda / Viviparidae. **Taxonomic status:** Species. **Habit:** Shallow water-Benthic. **Habitat:** Lentic freshwater Ponds. **Global Distribution:** Throughout India. **Current Regional Distribtuion:** Southern India. - **Elevation:** Below 200 m. - **Range (sq. km):** >20,000. - **Area Occupied (sq. km):** > 2,001. - **Number of locations:** Many (Tamil Nadu). **Population Trends:** - % Decline: 10 %. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing decline. **Data Quality:** Indirect information; Museum studies (T. Sathyamoorthy 1960 at Madras Museum); General field study (Anantharaman, 1982-83 in Tamil Nadu). **Recent Field Studies:** M.B. Ragnathan and V.R. Punithavelu, 1996-97 (collections) Chengalpet district. **Threats:** Loss of habitat; Pollution; Pesticides. **Trade:** No. **Other Comments:** Banded pond snail (common name). **Status- IUCN: LOWER RISK - NEAR THREATENED (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations: - Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendations: - Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programms:**None. - **Names of facilities:** —. **Sources:** Anantharaman, M. MAB Project: The Ecology Distribution and documentation of Freshwater Gastropods of Tamil Nadu and their Cercarial Fauna (1 Oct. 1984 -31 Mar 1988). Sathyamurthy, S.T. (1960) The Land and Freshwater Mollusca in the Collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum.* **Compilers:** R. Natarajan, M.B. Ragnathan, S. Paulraj, V.R. Punithavelu, C. Gunasekaran, Sathish Kumar.

**11. *Bellamya dissimilis* -- LRnt -- (*Viviparus dissemilis*, (Muller) -- Order /Family:** Megagastropoda / Viviparidae. **Taxonomic status:** Species. **Habit:** Shallow Benthic water. **Habitat:** Pond, lentic freshwater . **Global Distribution:** India and neighbouring countries. **Current Regional Distribtuion:** Southern India . - **Elevation:** 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** 9; Fragmented. **Population Trends:** - % Decline: 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing gradual decline. **Data Quality:** General field study; Informal field sightings. **Recent Field Studies:** M.B. Ragnathan and V.R. Punithavelu, 1996-97 in Chengalpet Dist. **Threats:** Loss of habitat; Pollution; Pesticides. **Trade:** No. **Other Comments:** Common pond snail (common name). **Status- IUCN: LOWER RISK -NEAR THREATENED (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations: - Research management:** Survey; Cercarial studies. - **PHVA:** No. **Captive Breeding Recommendation: - Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programms:** None. - **Names of facilities:** —. **Sources:** Anantharaman, M. MAB Project: The Ecology Distribution and documentation of Freshwater Gastropods of Tamil Nadu and their Cercarial Fauna (1 Oct. 1984 -31 Mar 1988). Sathyamurthy, S.T.(1960) The Land and Freshwater Mollusca in the Collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum.* **Compilers:** R. Natarajan, M.B. Ragnathan, S. Paulraj, V.R. Punithavelu, C. Gunasekaran, Sathish Kumar.

**12. *Bithynia stenothyroides* (Dohrn) -- LRnt -- Order /Family:** Megagastropoda / Hydrobiidae. **Taxonomic status:** Species. **Habit:** Phytophagous, littoral. **Habitat:** Lentic and lotic freshwater. **Global Distribution:** Southern India and Sri Lanka. **Current Regional Distribtuion:** Southern India . - **Elevation:** 2,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Five (Nilgiris, Madras, Thiruchirapalli, South Arcot, Pune ); Fragmented. **Population Trends:** - % Decline: 15%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline in population. **Data Quality:** General field study (R. Natarajan, 1950s). **Recent Field Studies:** None. **Threats:** Loss of habitat; Pollution; Pesticides. **Trade:** No. **Other Comments:** Little known about the species. **Status- IUCN: VULNERABLE (Nationally). DATA DEFICIENT (Globally).** - **Criteria based on:** B1, 2a, 2c (Restricted distribution, severely fragmented, limited location, continuing decline in extent of occurrence, and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations: - Research management:** Survey. - **PHVA:** No. **Captive Breeding**

**Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Moderately difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Sathyamurthy, S.T. (1960) The land and freshwater mollusca in the collection of Madras Govt. Museum, *Bulletin of Government Museum of Natural History*, Vol 1, No. 4. **Compilers:** R. Natarajan, M.B. Ragnathan, C. Gunasekaran, M.S. Ravichandran.

**13. *Chondromorpha kelaarki* (Humbert) -- LR1c -- Order/Family:** Polydesmida / Paradoxosomatidae. **Taxonomic status:** Species. **Habit:** Decomposed litter feeder. **Habitat:** Moist area with organic matter. **Global Distribution:** Not known. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 2,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - **% Decline:** No change. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known (10 -100 per m<sup>2</sup> in each microhabitat). **Global Population:** Not known. **Regional Population:** No change. **Data Quality:** General field study. **Recent Field Studies:** K. Bano, 1995 onwards in Karnataka; M. Mary Bai, 1995 onwards in Tamil Nadu. **Threats:** Loss of habitat; Climate; Drought. **Trade:** No. **Other Comments:** Species of the genus are identical externally distinguishable only by microscopic inspection of the gonads. Secretes hydrogen cyanide from pores in keels. **Status- IUCN:** LOWER RISK - LEAST CONCERN (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Taxonomic and morphological genetic studies; Survey. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Attens, C. (1936) Diplopoda of India. *Mem. Ind. Mus.* 11: 212. **Compilers:** K. Bano, M. Mary Bai, M.V. Reddy, T.J. Indira, P. Ahimaz, R. Bhanumati.

**14. *Corbicula regularis* (Prime) -- DD -- Order /Family:** Eulamellibranchiata / Corbicullidae. **Taxonomic status:** Species. **Habit:** Filter feeder. **Habitat:** Lentic and lotic fresh water. **Global Distribution:** Throughout India. **Current Regional Distribution:** Southern India. - **Elevation:** 1,500 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** 1. **Population Trends:** - **% Decline:** 15%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline in population. **Data Quality:** Museum collection. **Recent Field Studies:** None. **Threats:** Not known. **Other Comments:** Not reported after 1960. **Status- IUCN:** DATA DEFICIENT (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Moderately difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Sathyamurthy, S.T. (1960) *The land and freshwater mollusca in the collection of Madras Govt. Museum*, *Bulletin of Government Museum of Natural History*, Vol 1, No. 4. **Compilers:** R. Natarajan, M.B. Ragnathan, M.S. Ravichandran, C. Gunasekaran.

**15. *Crematogaster rogenhoferi* Forel. -- LR1c -- Order /Family:** Hymenoptera / Formicidae. **Taxonomic status:** Species. **Habit:** Carnivorous, phytophagous, honey dew and pollen feeder. **Habitat:** Tree inhabiting. **Global Distribution:** Widely distributed in India, Myanmar, Tenasserim. **Current Regional Distribution:** Southern India, limited to forest ecosystem. - **Elevation:** up to 2,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** Stable. - **% Decline:** Not known. - **Time / Rate (Yrs or gens):** —. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Not known. **Data Quality:** General field study. . . **Recent Field Studies:** T.M. Mustak Ali, 1992, Karnataka; R. Mathew, 1974-95 Northeastern India. **Threats:** No. **Trade:** No. **Other Comments:** Associated with homopterans, may be beneficial in cashew orchards as it feeds on *Helopeltis antonii*. **Status- IUCN:** LOWER RISK -LEAST CONCERN (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Habitat management; Life history studies. - **PHVA:** Pending. **Captive Breeding Recommendation:** - **Captive breeding:** Level 3. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Personal observation/comments: D. Rajagopal (Paper under preparation). Ali, T.M.M. (1992) Ants of Karnataka II, *IUSSI Newsletter*, 6(1&2): 1-9. Mathew, R. *Fauna of Meghalaya*, Part II Invertebrates, (in press). **Compilers:** D. Rajagopal, A.K. Chakravarthy, A.S. Vastrad, R. Mathew, B.A. Daniel.

**16. *Cypris dravidensis* (Victor and Michael) -- EN (B1,2c) -- (Shelled crustacean - seed shrimp). Order /Family:** Popocopida (Ostracoda) / Cyprididae. **Taxonomic status:** Species. **Habit:** Benthic, lentic. **Habitat:** Freshwater. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 4 (Pandarpur in Maharashtra; Madurai, Trichy, Tirupatanur (North Arcot Dist.,) in Tamil Nadu); Fragmented. **Population Trends:** - **% Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Gradual continuing decline in population observed. **Data Quality:** General field study (M.B. Ragnathan, 1977-83 in Madras; K. Revathi, 1982-85 in Madras). **Recent Field Studies:** M.B. Ragnathan, 1993-96 in freshwater bodies of Chengalpet district. Sunny George, 1988-94 in Kerala. **Threats:** Loss of habitat; Pollution; Human interference. **Trade:** No. **Other Comments:** Waterbodies in urban areas are desilted for commercial purposes and in rural area for agriculture. Discontinuous Distribution. **Status- IUCN:** ENDANGERED. - **Criteria based on:** B1, 2c (Restricted distribution, limited location, severely fragmented, continuing decline observed in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** George, S., 1993, Ph.D. Thesis, Calicut University, Calicut. Victor, R. and C. H. Fernando, (1979) *The freshwater Ostracods of India*, Records of the Z.S.I. Vol. 74, (Part 2). **Compilers:** S. Paulraj, M.B. Ragnathan, K. Revathi, J.T. Jothinayagam, M. Ramalingam, Mr. Satish Kumar, V.R. Punithavelu.



**17. *Cypris protubera* Victor and Fernando -- EN (B1,2a,2c) -- Order /Family:** Podocopa (Ostracoda) / Cyprididae. **Taxonomic status:** Species. **Habit:** Littoral / Benthic. **Habitat:** Benthic lentic freshwater. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 1,000 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 2 (Trichy and Madurai district in Tamil Nadu). **Population Trends:** - % Decline: 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Gradual continuing decline in population observed. **Data Quality:** General field study (M.B. Raghunathan, 1977-83 and K. Revathi, 1982-85 in Madras). **Recent Field Studies:** M.B. Raghunathan, 1993-96 In freshwater bodies of Chengalpet Dist. Dr. Sunny George, 1988-94 in Kerala. **Threats:** Loss of habitat; Pollution; Human interference. **Trade:** No. **Other Comments:** Waterbodies in urban areas are desilted for commercial purposes and in rural areas for agriculture. **Status-IUCN:** ENDANGERED. - **Criteria based on:** B1, 2a, 2c, (Restricted distribution, limited location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** George, S. (1993) Ostracods of Kerala Ph.D. thesis, Calicut University, Calicut. Victor, R. and C.H. Fernando, (1979) The Freshwater Ostracods of India, *Records of the ZSI* Vol. 74 (Part 2) pp. 147-242. **Compilers:** S. Paulraj, M.B. Raghunathan, K. Revathi, Sathish Kumar.

**18. *Cypris subglobosa* Sowerby - LR -nt -- Order /Family:** Podocopa (Ostracoda) / Cyprididae. **Taxonomic status:** Species. **Habit:** Benthic, Lentic. **Habitat:** Freshwater. **Global Distribution:** Throughout India. **Current Regional Distribution:** Peninsular India. - **Elevation:** Up to 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** 10; Fragmented. **Population Trends:** - % Decline: 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline observed. **Data Quality:** General field study. (M.B. Raghunathan, 1977-83 and K. Revathi, 1982-85 in Madras). **Recent Field Studies:** M.B. Raghunathan, 1993 -till date In freshwater bodies of Chengalpet district. Sunny George, 1988-94 in Kerala. **Threats:** Loss of habitat; Pollution; Human interference. **Trade:** No. **Other Comments:** Water bodies in urban areas are desilted for commercial purposes and in rural areas for agriculture. **Status-IUCN:** LOWER RISK -NEAR THREATENED (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** Level 1. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** George, S. (1993) Ph.D. Thesis, Calicut University, Calicut. Victor, R. and Fernando, C.H. (1979) The Freshwater Ostracods of India, *Records of the ZSI* Vol. 74 (Part 2) pp. 147-242. **Compilers:** S. Paulraj, M.B. Raghunathan, K. Revathi, J.T. Jothirayagam, M. Ramalingam, Sathish Kumar, V. R. Punithavelu.

**19. *Dichogaster curgensis* -- LR-Ic -- (Earthworm). Order /Family:** Lumbricina / Octochaetidae. **Taxonomic status:** Species. **Habit:** Detritivorous. **Habitat:** Epigeic. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many ( Karnataka). **Population Trends:** No change. - % Decline: No change. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known (100-200 /m<sup>2</sup>). **Global Population:** No change observed. **Data Quality:** General field study. **Recent Field Studies:** K. Bano, 1989-91; 94. **Threats:** Change in edaphic factors; Pesticides; Drought. **Trade:** No. **Other Comments:** This species is being used for vermicomposting. *In situ* studies: for organic matter turn over can be studied. **Status-IUCN:** LOWER RISK - LEAST CONCERN. - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Monitoring; Limiting factor management. - **PHVA:** Pending. **Captive Breeding Recommendations:** - **Captive breeding:** Level 3. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Bano, K. and Kale, R.D. (1991) Earthworm fauna of southern Karnataka. In: *Advances in Management and conservation of Soil fauna*. (Eds). Veeresh G.K, Rajagopal. D and Virakthamath, C.A. Oxford. I.B.H. publishers. pp.627-634. **Compilers:** M.V. Reddy, K. Bano, M. Mary Bai, T.J. Indira, P. Ahimaz, R. Bhanumathi.

**20. *Drawida nilamburensis* -- CR (B1,2a,2b,2c) -- Family:** Moniligastridae. **Taxonomic status:** Species. **Habit:** Geophagous (soil eating). **Habitat:** Deep burrowing form (Anecid). **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Kerala. - **Elevation:** Around 1,000 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 1 (Nilambur forests). **Population Trends:** - % Decline: 20%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Restricted distribution and continuing decline in population. **Data Quality:** Informal field sighting (J.M. Julka, 1989 collection; P. Ahimas, WWF 1996). **Recent Field Studies:** None. **Threats:** Collection, Loss of habitat. **Trade:** Not known. **Other Comments:** 20% decline in the habitat is predicted in next 10 years; Vikram Ganapathy collected the largest specimen in southern India. A trial of introducing the species into sugar cane field in Tamil Nadu failed. **Status-IUCN:** CRITICALLY ENDANGERED. - **Criteria based on:** B1, 2a, 2b, 2c (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** : No. **Recommendations:** - **Research management:** Monitoring; Habitat management; Limiting factor research, Survey. - **PHVA:** Yes. **Captive Breeding Recommendation:** - **Captive breeding:** Pending. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Julka, J.M. (1988) *Fauna of India: Megadrile Oligochaeta (earthworms)*. Vol.1: *Family Octochaetidae*. Zoological Survey of India, Calcutta. Stephenson, J. (1923) *Fauna of British India: Oligochaeta*. Today and Tomorrow's Printers and Publishers, New Delhi. **Compilers:** R. Radhakrishna, Sultan Ismail, P.T. Cherian, M.B. Raghunathan. Vikram Reddy, Kubra Bano, S. Indira, A.S. Vastrad, S. Paulraj, Ranjit Daniels, M. Mary Bai P. Ahimaz, R. Bhanumathi.

**21. *Ectrychotes bharathii* Murugan & Livingstone, 1989 -- CR (B1, 2c) -- Order /Family: Hemiptera / Reduviidae. Taxonomic status: Species. Habit: Underneath stones. Habitat: Scrub jungle. Global Distribution: ENDEMIC to southern India. Current Regional Distribution: Southern India. - Elevation: 1,050 m. - Range (sq. km): < 100. - Area Occupied (sq. km): < 10. - Number of locations: 1 (Kolli Hills, Tamil Nadu). Population Trends: - % Decline: Not known. - Time / Rate (Yrs or gens): Not known. - No. of Mature Individuals: Not known. Global Population: Not known. Data Quality: General field study (C. Murugan and D. Livingstone, 1988). Recent Field Studies: D. Livingstone & C. Murugan, 1977 in Kolli Hills. Threats: Human Interference; Loss of Habitat. Trade: No. Other Comments: Specimen not available even at the latest field trips to Kolli Hills. Status- IUCN: CRITICALLY ENDANGERED. - Criteria based on: B1, 2c (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - CITES: No. - IWPA (1972; 91): No. - RDB, National (old cat.): No. - RDB, International (old cat.): No. Recommendations: - Research management: Survey; Life history studies. - PHVA: No. Captive Breeding Recommendation: - Captive breeding: No. - Level of difficulty: Not known. Existing Captive Programmes: Not known. - Names of facilities: No. Sources: Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliata Assassin Bugs (Heteroptera : Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C. & Livingstone, D (1989) A new species of *Ectrychotes* Burm. from the Eastern Ghats - India (Heteroptera : Reduviidae : Ectrichodiinae), *Hexapoda* 1(1&2): 37-40. Compilers: D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G. Emiliyamma, B.A. Daniel**

**22. *Edocla heberii* Murugan & Livingstone, 1990 -- CR (B1, 2c) -- Order /Family: Hemiptera / Reduviidae. Taxonomic status: Species. Habit: Under stones. Habitat: Scrub jungle. Global Distribution: ENDEMIC to southern India. Current Regional Distribution: Southern India. - Elevation: 50m. - Range (sq. km): <100. - Area Occupied (sq. km): <10. - Number of locations: 1(Tambaram (MCC) Campus - near Heber Hall). Population Trends: - % Decline: Not known. - Time / Rate (Yrs or gens): Not known. - No. of Mature Individuals: Not known. Global Population: Not known. Data Quality: General field study (C. Murugan & D. Livingstone, 1985 in Madras Christian College campus). Recent Field Studies: Murugan and Livingstone on going project, MCC Campus. Threats: Grazing (Deer); Human interference. Trade: No. Other Comments: Ongoing studies did not yielded any individuals. Status- IUCN: CRITICALLY ENDANGERED. - Criteria based on: B1, 2c (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - CITES: No. - IWPA (1972; 91): No. - RDB, National (old cat.): No. - RDB, International (old cat.): No. Recommendations: - Research management: Survey; monitoring; Life History studies. - PHVA: No. Captive Breeding Recommendation: - Captive breeding: Level 3. - Level of difficulty: Not Known. Existing Captive Programmes: None. - Names of facilities: None. Sources: Murugan C. (1988) Biosystematics and Ecophysiology of the Tibiaroliata Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1990) Three new species of the genus *Edocla* Stal from southern India (Heteroptera: Reduviidae : Acanthaspidinae) *Arquivos do Museu Bocage*. I (39): 569 -577. Compilers: D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G. Emiliyamma, B.A. Daniel.**

**23. *Edocla maculatus* Murugan & Livingstone, 1990 -- EN (B1, 2c) -- Order /Family: Hemiptera / Reduviidae. Taxonomic status: Species. Habit: Underneath stones. Habitat: Scrub jungle. Global Distribution: ENDEMIC to southern India. Current Regional Distribution: Southern India. - Elevation: 300 -1,000 m. - Range (sq. km): 20,000. - Area Occupied (sq. km): < 500. - Number of locations: 3 (Yelagiri hill, Cutrallum, Alagar hills, Tamil Nadu). Population Trends: - % Decline: Not known. - Time / Rate (Yrs or gens): Not known. - No. of Mature Individuals: Not known. Global Population: Not known. Data Quality: General field study (C. Murugan & D. Livingstone 1985). Recent Field Studies: None. Threats: Human interference, Loss of Habitat. Trade: No. Other Comments: No. Status- IUCN: ENDANGERED. - Criteria based on: B1, 2c (Restricted distribution, limited location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - CITES: No. - IWPA (1972; 91): No. - RDB, National (old cat.): No. - RDB, International (old cat.): No. Recommendations: - Research management: Survey; Life history studies. - PHVA: No. Captive Breeding Recommendation: - Captive breeding: No. - Level of difficulty: Not known. Existing Captive Programmes: No. - Names of facilities:— Sources: Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliata Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1990) Three new species of the genus *Edocla* Stal from Southern India (Heteroptera : Reduviidae : Acanthaspidinae) *Arquivos do Museu Bocage*. I (39): 569 -577. . Compilers: D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G. Emiliyamma, B.A. Daniel.**

**24. *Edocla punctatum* Murugan & Livingstone, 1990 -- CR (B1, 2c) -- Order /Family: Hemiptera / Reduviidae. Taxonomic status: Species. Habit: Under stones. Habitat: Tropical. Global Distribution: ENDEMIC to southern India. Current Regional Distribution: Anamalai Hills, Tamil Nadu. - Elevation: 1,000 m. - Range (sq. km): < 100. - Area Occupied (sq. km): < 10. - Number of locations: 1(Topslip in Anamalai Hills, Tamil Nadu). Population Trends: - % Decline: Not known. - Time / Rate (Yrs or gens): Not known. - No. of Mature Individuals: Not known. Global Population: Not known. Data Quality: General field studies, (D. Livingstone & C. Murugan 1985). Recent Field Studies: None. Threats: Human interference. Trade: No. Other Comments: Collected from Karian chola; These are restricted to particular area. Status- IUCN: CRITICALLY ENDANGERED. - Criteria based on: B1, 2c (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - CITES: No. - IWPA (1972; 91): No. - RDB, National (old cat.): No. - RDB, International (old cat.): No. Recommendations: Research management: Survey; Life history studies. - PHVA: No. Captive Breeding Recommendation: - Captive breeding: No. - Level of difficulty: Not known. Existing Captive Programmes: None. - Names of facilities:— Sources: Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliata Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1990) Three new species of the genus *Edocla* Stal from southern India (Heteroptera: Reduviidae: Acanthaspidinae) *Arquivos do Museu Bocage*. I (39): 569 -577. Compilers: D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G. Emiliyamma, B.A. Daniel.**

**25. *Eucoptacrella ceylonica* Kirby -- CR (B1, 2a, 2b, 2c) -- Order /Family:** Orthoptera / Acrididae. **Taxonomic status:** Species. **Habit:** Phytophagous. **Habitat:** Forest dwelling, Arborescent. **Global Distribution:** India and Sri Lanka. **Current Regional Distribution:** Southern India. - **Elevation:** About 1,000 M. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 2; Fragmented. **Population Trends:** - % Decline: 10 -20 % . - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline in restricted habitat. **Data Quality:** General field study. **Recent Field Studies:** A.S. Vastrad, 1991 in Prabhunagar Forest, Dharwad; M.S. Muralirangan, 1993 in . Tamil Nadu . **Threats:** Loss of habitat; Human interference . **Trade:** No. **Other Comments:** It seems to require highly specialised niche for its growth and population build up. . M.S. Muralirangan, 1993, intensive surveys in 30 localities in Tamil Nadu (did not yield any population). **Status- IUCN:** **CRITICALLY ENDANGERED (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on:** B1, 2a, 2b (Restricted distribution, severely fragmented, continuing decline in extent of occurrence and area of occupancy). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** : No. **Recommendations:** - **Research management:** Survey; Monitoring; Limiting factor research; Life history studies . - **PHVA:** Yes. **Captive Breeding Recommendations:** - **Captive breeding:** Level 3. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** No. - **Names of facilities:** —. **Sources:** Kumar, P. (1991) *Hexapoda*, 3 (1): 53-70. Murlirangan, M.C., Suresh,P., Dang, P.P and Gill, G.S (1993) Observations on the grass hopper species diversity and distributional pattern in peninsular India. *Entomologist*, 112(3&4): 201-210. Vastrad, A.S. (1991) Ecological distribution, lifeforms and food habits of . grasshoppers in Dhaward region, Karnataka, *Hexapoda*, 3(1): 94-99. **Compilers:** D. Rajagopal, A.K. Chakravarthy, A.S. Vastrad, R. Matthew, B.A. Daniel.

**26. *Eucypris bispinosa* Victor and Fernando -- CR (B1, 2a, 2c) -- Order /Family:** Podocopida (Ostracoda) / Cyprididae. **Taxonomic status:** Species. **Habit:** Littoral, Benthic. **Habitat:** Lentic freshwater. **Global Distribution:** ENDEMIC to Southern India. **Current Regional Distribution:** Tamil Nadu. - **Elevation:** Up to 500 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 1 (Nagamalai in Madurai). **Population Trends:** - % Decline: 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Gradual continuing decline in population observed. **Data Quality:** General field study. (M.B. Raghunathan, 1977 -83 and K. Revathi, 1982 -85 in Madras). **Recent Field Studies:** M.B. Raghunathan, 1993 -till date. In freshwater bodies of Chengalpet Dist. Sunny George, 1988 -94 in Kerala. **Threats:** Loss of habitat; Pollution; human interference. **Trade:** No. **Other Comments:** Water bodies in urban areas are desilted for commercial purposes and in rural areas for agriculture. **Status- IUCN:** **CRITICALLY ENDANGERED.** - **Criteria based on:** B1, 2a, 2c (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** George, S. (1993) Ostracods of Kerala Ph.D. thesis, Calicut University , Calicut. Victor, R. and Fernando, C.H. (1979) The Freshwater Ostracods of India, Records of the ZSI Vol. 74 (Part 2) pp. 147 - 242 . **Compilers:** S. Paulraj, M.B. Raghunathan, K. Revathi, J.T. Jothinayagam, M. Ramalingam, Sathish Kumar, V.R. Punithavelu.

**27. *Gyraulus convexiusculus* -- VU (B1, 2a, 2c) -- Order /Family:** Basommatophora / Planorbidae. **Taxonomic status:** Species. **Habit:** Phytophagous. **Habitat:** Fresh water lentic. **Global Distribution:** Throughout India. **Current Regional Distribution:** Southern India . - **Elevation:** About 900 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Many (Madras and vicinity, Vellore, Bangalore); Fragmented. **Population Trends:** - % Decline: 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline in population observed. **Data Quality:** General field study (R. Natarajan, 1955 -60 in Chidambaram, South Arcot dist.). Anantharaman, 1984 -88 in Tamil Nadu. **Recent Field Studies:** None. **Threats:** Loss of habitat; Pollution; Pesticides. **Trade:** No. **Other Comments:** Common species, widely distributed. **Status- IUCN:** **VULNERABLE (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on:** B1, 2a, 2c (Restricted distribution, severely fragmented, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** : No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None . - **Names of facilities:** —. **Sources:** Anantharaman, M. M.A.B. Project of the ecology, Distribution and documentation of freshwater gastropod of Tamil Nadu and their cercarial fauna (1 Oct 1984 to 31 March 1988). Sathyamurthy, S.T. (1960) The land and freshwater mollusca in the collection of Madras Govt. Museum, Bulletin of Government Museum of Natural History, 1(4) . **Compilers:** R. Natarajan, M.B. Raghunathan, S. Paulraj, C.Gunasekaran, K. Revathi.

**28. *Gyraulus saigonensis* -- LRnt -- (Crosse and Fisher). Order /Family:** Basommatophora / Planorbidae. **Taxonomic status:** Species. **Habit:** Littoral / Benthic. **Habitat:** Lentic freshwater. **Global Distribution:** Sri Lanka, Mayanmar, India. **Current Regional Distribution:** Southern India. - **Elevation:** 1,500 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** 3 (Madras, Vellore in Tamil Nadu, Bangalore in Karnataka); Fragmented. **Population Trends:** - % Decline: 10%. - **Time / Rate (Yrs or gens):** 10 Years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline. **Data Quality:** General field study (R. Natarajan, 1958 in Chidambaram). **Recent Field Studies:** Informal field sightings only. **Threats:** Loss of habitat; Pesticides; Pollution. **Trade:** No. **Other Comments:** Less than quarter inch -8 mm (maximum size). (After 1958 no collections were made because of the minute size). **Status- IUCN:** **LOWER RISK -NEAR THREATENED (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** No. - **Level of difficulty:** Moderately difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Anantharaman, M. M.A.B. Project of the ecology, Distribution and documentation of freshwater gastropod of Tamil Nadu and their cercarial fauna (1 Oct 1984 to 31

March 1988). Sathyamurthy, S.T. (1960) The Land and Freshwater Mollusca in the collection of Madras Govt. Museum, *Bulletin of Govt. Museum*, N.H. VI, No. 4. **Compilers:** M.B. Ragunathan, R. Natarajan, C. Gunasekaran.

**29. *Haematorrhophus fovealis* Murugan & Livingstone, 1995 -- CR (B1, 2c) -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Under stone. **Habitat:** Semi-arid. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 300 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** 10. - **Number of locations:** 1 (Malumichampatti, Tamil Nadu). **Population Trends:** - % **Decline:** Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** General field study (C. Murugan & D. Livingstone, 1985-90 in Malumichampatti). **Recent Field Studies:** None. **Threats:** Human interference. **Trade:** No. **Other Comments:** Surveys were conducted till 1990 but no results, Feed on millipedes. Shiny insects - dark coloured. **Status- IUCN: CRITICALLY ENDANGERED.** - **Criteria based on: B1, 2c** (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Life history studies. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities—.** **Sources:** Murugan C. (1988) Biosystematics and Ecophysiology of the Tibiaroliata Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1995) Description of a new genus of Ectrichodiinae and two new species of the genus *Haematorrhophus* Stal from southern India (Heteroptera: Reduviidae), *J. Bombay nat. Hist. Society.* 92 (32): 386 -389. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P.

**30. *Haematorrhophus ruguloscutellaris* Murugan & Livingstone 1995 -- VU (D2) -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Under boulders. **Habitat:** Scrub jungle. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 75 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 1 (Manimuthar, Thirunelveli Dist.). **Population Trends:** - % **Decline:** Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** General field studies (C. Murugan & D. Livingstone, 1984 in Manimuthar). **Recent Field Studies:** None. **Threats:** Not known. **Trade:** No. **Other Comments:** 1989 survey did not yield any specimen. Feeds on millipede - stings & sucks -dissolves completely by saliva. **Status- IUCN: VULNERABLE** - **Criteria based on: D2** (Restricted population in less than 100 sq.km, area of occupancy and a single locaton). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Life history studies; Monitoring. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** Level 3. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities—.** **Sources:** Murugan C. (1988) Biosystematics and Ecophysiology of the Tibiaroliata Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1995) Description of a new genus of Ectrichodiinae and two new species of the genus *Haematorrhophus* Stal from Southern India (Heteroptera : Reduviidae), *J. Bombay nat. Hist. Society.* 92 (32): 386 -389. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G. Emiliyamma, B.A. Daniel.

**31. *Hemihematorrhophus planidorsatus* Murugan & Livingstone 1995 -- EN (B1, 2c) -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Under stones. **Habitat:** Moist deciduous. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 300 -1,000 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 4 (Yelagiri Hills; Servalar; Alagar Koil; Courtallam); Fragmented. **Population Trends:** - % **Decline:** Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** General field studies (C. Murugan & D. Livingstone, 1983 in Servalar; 1984 in Yelagiri Hills; 1985 in Alagar koil & Courtallam). **Recent Field Studies:** None. **Threats:** Loss of Habitat; Human Interference; Grazing. **Trade:** No. **Other Comments:** 1990 survey in Alagar Koil dist. did not yield specimen. New Genus in the subfamily Ectrichodiinae. Monotypic. **Status- IUCN: ENDANGERED.** - **Criteria based on: B1, 2c** (Restricted distribution, limited location, fragmented, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Life history studies; Monitoring. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities—.** **Sources:** Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliata Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1995) Description of a new genus of Ectrichodiinae and two new species of the genus *Haematorrhophus* Stal from southern India (Heteroptera- Reduviidae), *J. Bombay nat. Hist. Society.* 92 (32): 386 -389. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalanthi, K.G. Emiliyamma, B.A. Daniel.

**32. *Heterometrus barberi* (Pocock) -- EN (B1, 2c) -- Order /Family:** Scorpiones / Scorpionidae. **Taxonomic status:** Species. **Habit:** Nocturnal. **Habitat:** Dense forest. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Tamil Nadu. - **Elevation:** 1,000 - 1,500 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** 1 (Kalakkad Mundanthurai). **Population Trends:** - % **Decline:** Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Restricted habitat. Population trend not known. **Data Quality:** General field study; Informal field sighting (Indira, ZSI; P. Ahimaz, WWF). **Recent Field Studies:** M.S. Ravichandran, 1995 in Kalakkad Mundanthurai. **Threats:** Human interference; Loss of habitat. **Trade:** No. **Other Comments:** Restricted range; not studied at length; specimen collected in 1900, London Museum. First specimen collected in early 1900 by Mr. Pocock, deposited in British Museum of Natural History; subsequent specimens collected / observed in late 1980's and early 1990's. It may be inferred that this species is rare. Captive breeding - Generally easy in case of scorpions but not known in this case. Classified by group as endemic species. **Status- IUCN: ENDANGERED.** - **Criteria based on: B1, 2c** (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or

quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Taxonomic and morphological genetic studies; Survey; Monitoring; Life history study. - **PHVA:** Pending. **Captive Breeding Recommendations:** - **Captive breeding:** Pending. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Pocock, R.I (1900) *The Fauna of British India, including Ceylon and Burma*. Arachnida. Today and Tomorrow's Printers and Publishers, New Delhi. . Tikadar, B.K & D.B.Bastawade. (1983) *Fauna of India: Scorpions*. Arachnida. Vol. III: 1-667. **Compilers:** Indira, K. Bano, Mary Bai, M.V. Reddy, P. Ahimaz, R. Bhanumati.

**33. *Heterometrus keralensis* Tikader & Bastawade -- EN (B1, 2c) -- Order /Family:** Scorpiones / Scorpionidae. **Taxonomic status:** Species. **Habit:** Nocturnal. **Habitat:** Dense forest. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Kerala. - **Elevation:** 500 -1600 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 1 (New Amarambalam). **Population Trends:** - % **Decline:** 10 %. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Gradual decline. **Data Quality:** General field study (Pillai *et al.* (ZSI, SRS), 1983). **Recent Field Studies:** None. **Threats:** Human interference; Loss of habitat. **Trade:** No. **Other Comments:** Not sighted often before or after the first report (1983). 2 mature specimens from one location. Difficult to procure due to rarity. **Status- IUCN:** ENDANGERED. - **Criteria based on:** B1, 2c (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Taxonomic and genetic morphological studies; Survey; Monitoring; Habitat management; Limiting factor research; Life history studies. - **PHVA:** Pending. **Captive Breeding Recommendations:** - **Captive breeding:** Level 3. - **Level of difficulty:** Very difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Pocock, R.I (1900) *The Fauna of British India, including Ceylon and Burma*. Arachnida. Today and Tomorrow's Printers and Publishers New Delhi. . Tikadar, B.K & D.B.Bastawade. (1983) *Fauna of India: Scorpions*. Arachnida. Vol. III: 1 -667. **Compilers:** T.J. Indira, P. Ahimaz, K. Bano, M.V. Reddy, M. Mary Bai, R. Bhanumathi.

**34. *Heterometrus malapuramensis* Tikader and Bastawade -- VU (A1c; B1, 2a, 2c) -- Order /Family:** Scorpiones / Scorpionidae. **Taxonomic status:** Species. **Habit:** Nocturnal carnivorous. **Habitat:** Mainly forest. **Global Distribution:** ENDEMIC to Southern India. **Current Regional Distribution:** Kerala and Tamil Nadu. - **Elevation:** Plains to 1,000 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** 5; Fragmented. **Population Trends:** - % **Decline:** 20 %. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Continuing decline. **Data Quality:** General field study; Informal field sighting (R.Bhanumathi, 1990. Topslip, I.G.Sanctuary). **Recent Field Studies:** M.S. Ravichandran, 1996. **Threats:** Loss of habitat. **Trade:** No. **Other Comments:** . **Status- IUCN:** VULNERABLE. - **Criteria based on:** A1c. ( Population reduction due to decline in extent of occurrence, area of occupancy and /or quality of habitat); B1, 2a, 2c (Restricted distribution, limited locations fragmented, continuing decline in extent of occurrence and /or area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Life history studies; Limiting factor research. - **PHVA:** Pending. **Captive Breeding Recommendations:** - **Captive breeding:** Pending. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Pocock, R.I (1900) *The Fauna of British India, including Ceylon and Burma*. Arachnida. Today and Tomorrow's printers and Publishers New Delhi. . Tikadar, B.K & D.B.Bastawade. (1983) *Fauna of India: Scorpions*. Arachnida. Vol. III: 1 -667. . **Compilers:** T.J. Indira, M. Mary Bai, M.V. Reddy, K. Bano, P. Ahimaz, R. Bhanumathi.

**35. *Heterometrus swammerdami* (Simon) -- VU (A1a, 1c) -- Order/ Family:** Scorpiones / Scorpionidae. **Taxonomic status:** Species. **Habit:** Nocturnal, carnivora. **Habitat:** Cosmopolitan. **Global Distribution:** India and Sri Lanka. **Current Regional Distribution:** Southern India. - **Elevation:** Plains. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - % **Decline:** 20%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing decline observed. **Data Quality:** General field study; Informal field sighting (Indira - pers. comm.; Mary Bai and party, ZSI) . **Recent Field Studies:** M. Mary Bai and party, ZSI, 1995; B. Rathinasabapathy & B.A. Daniel, 1997. in Anaikatty, Coimbatore Dist.,. **Threats:** Loss of habitat; Change in Edaphic factors; Human interference; Drought. **Trade:** No. **Other Comments:** . **Status- IUCN:** VULNERABLE (Regionally -southern India). **DATA DEFICIENT (Globally)** . - **Criteria based on:** A1a, 1c ( Population reduction observed due to decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Habitat management. - **PHVA:** Yes. **Captive Breeding Recommendation:** . - **Captive breeding:** Level 1. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Pocock, R.I (1900) *The Fauna of British India, including Ceylon and Burma*. Arachnida. Today and Tomorrow's Printers and Publishers, New Delhi. . Tikadar, B.K & D.B. Bastawade. (1983) *Fauna of India: Scorpions*. Arachnida. Vol. III: 1 -667. **Compilers:** T.J. Indira, M. Mary Bai, K. Bano, M.V. Reddy, P. Ahimaz, R. Bhanumathi, B.A. Daniel.

**36. *Ilyocyptus spinifer* (Herrick) -- LRnt -- Order /Family:** Cladocera. **Taxonomic status:** Species. **Habit:** Littoral / Benthic. **Habitat:** Lentic freshwater. **Global Distribution:** China, Australia, North America, India. **Current Regional Distribution:** Southern India. - **Elevation:** 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** 1 (Thiruvananthapuram). **Population Trends:** - % **Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline. **Data Quality:** General field study (R.G. Michael and B.K. Sharma, 1980s). **Recent Field Studies:** None. **Threats:** Pollution; Loss of habitat; Pesticides. **Trade:** No. **Other Comments:** . **Status- IUCN:** LOWER RISK -NEAR THREATENED (Regionally -southern india). **DATA DEFICIENT (Globally)**. - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Michael, R.G. and Sharma, B.K.

(1988) *Fauna of India and Adjacent countries* (Crustacea, Brachiopoda, Cladocera) Zoological Survey of India, . pp. 1-262.  
**Compilers:** M.B. Ragnathan, R. Natarajan, M.S. Ravichandran, C. Gunasekaran.

**37. *Indoplanorbis exustus* (Deshayes) -- LRnt -- Order /Family:** Basommatophora / Planorbidae. **Taxonomic status:** Species. **Habit:** Lentic freshwater. **Habitat:** Ponds. **Global Distribution:** Sri Lanka, India, China, Indonesia and Myanmar. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many (Bangalore in Karnataka; Tamil Nadu). **Population Trends:** - % **Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline observed. **Data Quality:** General field studies (MAB Project 1984-87 in 72 localities of Tamil Nadu). **Recent Field Studies:** M.B. Ragnathan and V.R. Punithavelu, 1996-97 in Chengalpet Dist. **Threats:** Loss of habitat; Pollution; Pesticides. **Trade:** Not known. **Other Comments:** . **Status-IUCN:** LOWER RISK - NEAR THREATENED (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey, Cercarial studies. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Anantharaman, M. MAB Project: The Ecology Distribution and documentation of Fresh water Gastropods of Tamil Nadu and their Cercarial Fauna (1 Oct. 1984 - 31 Mar 1988). Sathyamurthy, S.T. (1960) The Land and Freshwater Mollusca in the Collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum.*  
**Compilers:** R. Natarajan, M.B. Ragnathan, V.R. Punithavelu, S. Paulraj, C. Gunasekaran, Satish Kumar.

**38. *Isometrus brachycentrus* -- VU (B1, 2a, 2c) -- Order /Family:** Scorpiones / Buthidae. **Taxonomic status:** Species. **Habit:** Nocturnal. **Habitat:** Forest. **Global Distribution:** ENDEMIC to Western Ghats. **Current Regional Distribution:** .Western Ghats. - **Elevation:** 1,000 - 1,500 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Collected from 3 locations (Anamalai, Mangalore, Kerala). **Population Trends:** - % **Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Gradual continuing decline observed. **Data Quality:** General field study, (G.U. Kurup, Dec 1983). **Recent Field Studies:** G.U. Kurup, February 1992. **Threats:** Human interference; Loss of habitat. **Trade:** No. **Other Comments:** Rare species. **Status-IUCN:** VULNERABLE. - **Criteria based on:** B1, 2a, 2c ( Restricted distribution, Limited location, continuing decline in extent of occurrence, and /or area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Taxonomic and morphological genetic studies; Survey; Monitoring; Life history studies. - **PHVA:** Pending. **Captive Breeding Recommendation:** . - **Captive breeding:** Pending. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Pocock, R.I (1900) *The Fauna of British India, including Ceylon and Burma.* Arachnida. Today and Tomorrow's Printers and Publishers, New Delhi. . Tikadar, B.K & D.B. Bastawade. (1983) *Fauna of India: Scorpions.* Arachnida. Vol. III: 1 -667. **Compilers:** T.J. Indira, V.M. Reddy, Mary Bai, K. Bano, P. Ahimaz, R. Bhanumathi.

**39. *Lamellidens marginalis* (Lamarele) -- LRnt -- Order /Family:** Eulamethibranchiata / Unionidae. **Taxonomic status:** Species. **Habit:** Benthic, filterfeeder. **Habitat:** Lentic and Lotic freshwater. **Global Distribution:** India, Myanmar, Sri Lanka. **Current Regional Distribution:** Southern India. - **Elevation:** 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - % **Decline:** 15%. - **Time / Rate (Yrs or gens):** 10. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline. **Data Quality:** General field studies. **Recent Field Studies:** M.B. Ragnathan, 1996 Sep. in Dharmapuri Dist. **Threats:** Loss of habitat; Harvest (for lab. studies). **Trade:** No. **Other Comments:** Collections for laboratory studies. **Status-IUCN:** LOWER RISK -NEAR THREATENED (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** . **Compilers:** M.B. Ragnathan, R. Natarajan, M.S. Ravichandran, C. Gunasekaran.

**40. *Lychas tricarinatus* Simon -- LRlc -- Order /Family:** Scorpiones / Buthidae. **Taxonomic status:** Species. **Habit:** Nocturnal. **Habitat:** Cosmopolitan in distribution. **Global Distribution:** Widely distributed in India. **Current Regional Distribution:** Southern India. - **Elevation:** Plains to 1000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many (Chennai, Chengalpet, Salem, Dharmapuri, Pondicherry, Nilgiris). **Population Trends:** No change. - % **Decline:** No change. - **Time / Rate (Yrs or gens):** No change. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** No change observed. **Data Quality:** General field study ZSI (SRS) from 1980 onwards. **Recent Field Studies:** Mary Bai and party during Feb. 1997 (ZSI) in Chengalpet Dist.,; B. Rathinasabapathy & B.A. Daniel, 1997 in Anaikatty, Coimbatore Dist.,. **Threats:** Human interference; Loss of habitat. **Trade:** No. **Other Comments:** —. **Status-IUCN:** LOWER RISK -LEAST CONCERN (southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Monitoring; Research on venom for medical purposes. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Pocock, R.I (1900) *The Fauna of British India, including Ceylon and Burma.* Arachnida. Today and Tomorrow's Printers and Publishers New Delhi. . Tikadar, B.K & D.B. Bastawade. (1983) *Fauna of India: Scorpions.* Arachnida. Vol. III: 1 -667. **Compilers:** T.J. Indra, M.V. Reddy, Mary Bai, K. Bano, P. Ahimaz, R. Bhanumathy, B.A. Daniel.

**41. *Lymnaea acuminata* -- NE -- Order /Family:** Basommatophora / Lymnaeidae. **Taxonomic status:** Species. **Habit:** Attach to floating algae. **Habitat:** Fresh water lentic. **Global Distribution:** India and Burma. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 900 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many; Fragmented. **Population Trends:** - % **Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years.

- **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline. **Data Quality:** General field studies. (Natarajan, 1956; 1958 -60 in Chidambaram;. Anantharaman, 1984 -88 in Tamil Nadu). **Recent Field Studies:** None. **Threats:** Loss of habitat; Pollution; Pesticides. **Trade:** No. **Other Comments:** Common species, widely distributed. Only shells have been studied as no living specimen in Tamil Nadu studied. Latent studies. No report of species. Specimen identification made on the basis of dead shells only. No authentic information available. **Status-IUCN:** NOT EVALUATED. - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:**None. - **Names of facilities:** —. **Sources:** Anantharaman, M. MAB Project: The Ecology Distribution and documentation of Freshwater Gastropods of Tamil Nadu and their Cercarial Fauna (1 Oct. 1984 - 31 Mar 1988). Sathyamurthy, S.T. (1960) The Land and Freshwater Mollusca in the collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum..* **Compilers:** M.B. Raghunathan, S. Paulraj, K. Revati, R. Natarajan, C. Gunasekaran.

**42. *Lymnaea luteola* -- LRnt -- Order /Family:** Basommatophora / Lymnaeidae. **Taxonomic status:** Species. **Habit:** Attached to aquatic vegetation. **Habitat:** Fresh water lentic. **Global Distribution:** Indian subcontinent. **Current Regional Distribtuion:** Southern India. - **Elevation:** About 900 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many ( Bangalore, Conoor, Trichy, Madras). **Population Trends:** - **% Decline:** 10 %. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline observed. **Data Quality:** General field studies (R. Natarajan 1955-60 in Chidambaram; Anantharaman, 1984-88 in Tamil Nadu) . **Recent Field Studies:** None. **Threats:** Loss of habitat; Pollution; Pesticides. **Trade:** No. **Other Comments:** Common species, widely distributed. **Status- IUCN:** LOWER RISK -NEAR THREATENED (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** —. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:**None. - **Names of facilities:** —. **Sources:** Anantharaman, M. MAB Project: The Ecology Distribution and documentation of Freshwater Gastropods of Tamil Nadu and their Cercarial Fauna (1 Oct. 1984 -31 Mar 1988). Sathyamurthy, S.T. (1960) The Land and Freshwater Mollusca in the Collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum..* **Compilers:** R. Natarajan, M.B. Raghunathan, S. Paulraj, K. Revati, C. Gunasekaran.

**43. *Macrotermes estherae* (Desneux) -- EN (B1, 2a, 2b, 2c, 2d) -- (*Termes estherae* Desneux). Order/ Family:** Isoptera / Termitidae. **Taxonomic status:** Species. **Habit:** Dry grass and leaf litter. **Habitat:** Subterranean in forests and plantations between 500-1,500 m. **Global Distribution:** India, Sri Lanka. **Current Regional Distribtuion:** Karnataka, Tamil Nadu, Andhra Pradesh. - **Elevation:** 500-1,500 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** Many; Fragmented. **Population Trends:** - **% Decline:** 30%. - **Time / Rate (Yrs or gens):** 10 yrs. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing decline observed. **Data Quality:** General field studies (D. Rajagopal, 1983, Karnataka). **Recent Field Studies:** D. Rajagopal, 1997 in Karnataka . **Threats:** Loss of habitat; Change in edaphic factors . **Trade:** No. **Other Comments:** Restricted to forest and plantations. Largest size among termites. Length of soldier 15 to 16mm. Length with wings ca.32 to 33mm. **Status- IUCN:** **ENDANGERED (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on:** B1, 2a, 2b, 2c, 2d (Restricted distribution, severely fragmented, continuing decline in area, extent of occurrence, quality of habitat and number of locations). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Habitat management; Limiting factor research . - **PHVA:** Pending. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Rajagopal, D. (1983) Habit and habitat studies of some termites of Karnataka. *J.Soil Biol. Ecol.* 3(2): 108 -123. Chhotani, O.B. (1980) *Termite pest of Agriculture in the Indian Region and their control,* . ZSI, Calcutta. **Compilers:** D. Rajagopal, A.K. Chakravathy, A.S. Vastrad, R. Mathew, B.A. Daniel.

**44. *Macrothrix laticornis* (Jurine) -- LRnt -- Order /Family:** Cladocera / Macrothricidae. **Taxonomic status:** Species. **Habit:** Littoral / Benthic. **Habitat:** Lentic freshwater. **Global Distribution:** Distributed throughout the world. **Current Regional Distribtuion:** Southern India . - **Elevation:** Up to 3,050 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** 3 (Tamil Nadu, Karnataka, Kerala - Irinjalkuda). **Population Trends:** - **% Decline:** 10 %. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline observed. **Data Quality:** General field studies. **Recent Field Studies:** M.B. Raghunathan 1993-97 in Tamil Nadu. **Threats:** Loss of habitat; Pollution; Pesticides. **Trade:** No. **Other Comments:** No. **Status- IUCN:** LOWER RISK - NEAR THREATENED (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** No. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** Monitoring. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:**None. - **Names of facilities:** —. **Sources:** Michael, R.G. and Sharma B.K. (1988) *Fauna of India and adjacent countries..* Indian Cladocera (Crustacea, Brachopoda, Cladocera). **Compilers:** M.B. Raghunathan, R. Natarajan, M.S. Ravichandran, C. Gunasekaran.

**45. *Melania scabra* -- VU (A1c) -- Order /Family:** Megagastropoda / Melaniidae. **Taxonomic status:** Species. **Habit:** Attached to hard substances. **Habitat:** Lotic freshwater. **Global Distribution:** Throughout the world in Equatorial regions. **Current Regional Distribtuion:** Southern India. - **Elevation:** Up to 500 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - **% Decline:** 20%. - **Time / Rate (Yrs or gens):** 10. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing decline in population observed. **Data Quality:** General field studies (Anantharaman, 1984 -88 in Tamil Nadu) and indirect information. **Recent Field Studies:** None. **Threats:** Loss of habitat; Pollution; Pesticides. **Trade:** No. **Other Comments:**

Common species; widely distributed. **Status- IUCN: VULNERABLE (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on: A1c** (Population reduction due to decline in area of occupancy, extent of occurrence and /or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** No. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Anantharaman, M. MAB Project: The Ecology Distribution and documentation of Freshwater Gastropods of Tamil Nadu and their Cercarial Fauna (1 Oct. 1984 -31 Mar 1988). Sathyamurthy, S.T. (1960) The Land and Freshwater Mollusca in the Collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum.*. **Compilers:** R. Natarajan, M.B. Ragnathan, S. Paulraj, K.Revathi, C. Gunasekaran, . V.R. Punithavelu.

**46. *Melania tuberculata* (Muller) -- VU (A1c) -- Order /Family:** Megagastropoda / Melanidae. **Taxonomic status:** Species. **Habit:** Attached to hard substratum. **Habitat:** Lotic freshwater. **Global Distribution:** Africa, Asia, China, N. Australia, India, Sri Lanka, Myanmar. **Current Regional Distribtuion:** Southern India. - **Elevation:** Up to 1,500 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many ( Madras, Pulla River, Cudappah, Pune, Mahe, Krusady Islands, Gulf of Mannar). **Population Trends:** - **% Decline:** 20%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing decline in population observed. **Data Quality:** General field studies (M. Anantharaman, 1984-88); Indirect information. **Recent Field Studies:** None. **Threats:** Loss of habitat; Pollution. **Trade:** No. **Other Comments:** Parthenogenetic reproduction. Well established species. **Status- IUCN: VULNERABLE (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on: A1c** (population reduction due to reduction in area of occupancy, extent of occurrence and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** No. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes**None. - **Names of facilities:** —. **Sources:** Sathyamurthy, S. T. (1960). The Land and Freshwater Mollusca in the Collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum.*. Anantharaman, M. MAB Project: The Ecology Distribution and documentation of Freshwater Gastropods of Tamil Nadu and their Cercarial Fauna (1 Oct. 1984 -31 Mar 1988). R. Natarajan, M.B. Ragnathan, S. Paulraj, V.R. Punithavelu , C. Gunasekaran.

**47. *Meranoplus bellii* Forel -- DD -- Order /Family:** Hymenoptera / Formicidae. **Taxonomic status:** Species. **Habit:** Nectar feeders. **Habitat:** Soil inhabiting, restricted to forests. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribtuion:** Southern India . - **Elevation:** 50 -1,100 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 5 (Jog falls in Shimoga and Coorg; Calicut in Kerala). **Population Trends:** - **% Decline:** Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Sighted only five times, Trends not known. **Data Quality:** General Field Studies (T.M.M. Ali, 1983 in Karnataka). **Recent Field Studies:** Sheila, 1992-96 in Calicut; T.C. Narendran and Sheela, 1994 in Calicut. **Threats:** Not known. **Trade:** No. **Other Comments:** Nests in hard soil. Restricted to forests. Population assessments have not been made. **Status- IUCN: DATA DEFICIENT.** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Life history studies. - **PHVA:** Pending. **Captive Breeding Recommendations:** - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Ali, T.M.M. (1992) Ants of Karnataka, *IUSSI Newsletter*, 3(1&2): 1-9. Bingham, C.T. (1903) *Fauna of British India including Ceylon and Burma*, . *Hymenoptera 2. Ants and Cukoo - wasps*. 506pp. London. . Bolton, B. (1995) *A New General Catalogue of the ants of the World*, Harvard University Press. **Compilers:** P.T. Cherian, D. Rajagopal, K.V. Lakshminarayana, R. Mathew, B.A. Daniel.

**48. *Mesacanthaspis kovaiensis* Livingstone & Murugan 1993 -- CR (B1, 2c) -- Order /Family:** Hemiptera / Reduviidae . **Taxonomic status:** Species. **Habit:** Under sotne. **Habitat:** Semi - arid. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribtuion:** Southern India. - **Elevation:** 350 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 2 (Chandrapuram and Maruthamalai, Coimbatore district); Fragmented. **Population Trends:** - **% Decline:** Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** General field studies (D. Livingstone & C. Murugan 1983-84 in Chandrapuram; D. Livingstone & C. Murugan 1989 in Maruthamalai). **Recent Field Studies:** None. **Threats:** Loss of Habitat; Grazing; Human intereferece. **Trade:** No. **Other Comments:** New genus in the subfamily Acanthaspidinae. Monotypic. **Status- IUCN: CRITICALLY ENDANGERED.** - **Criteria based on: B1, 2c** (Restricted distribution, limited location, severely fragmented, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Life history studies. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities**—. **Sources:** Murugan C. (1988) Biosystematics and Ecophysiology of the Tibiaroliata Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1993) Description of a new genus of Acanthaspidinae Stal with a key for the southern Indian genera (Heteroptera: Reduviidae), *Hexopoda* 5(1): 37 -44. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalenth, K.G. Emiliyamma, B.A. Daniel.

**49. *Mesobuthus hendersoni* (Pocock) -- LRlc -- Order /Family:** Scorpiones / Buthidae. **Taxonomic status:** Species. **Habit:** Nocturnal. **Habitat:** Cosmopolitan; forests, cities, coconut groves, humid places. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribtuion:** Southern India. - **Elevation:** Plains. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many (Chennai, Chengleput, S. Arcot, N. Arcot, Pondichery, Nilgiris in Tamil Nadu; Andhra Pradesh). **Population Trends:** - **% Decline:** No change. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** No change observed. **Data Quality:** General field study (ZSI scientists from 1983 onwards). **Recent Field Studies:** T.J. Indira - ongoing surveys. **Threats:** Loss



of habitat; Human interference. **Trade:** No. **Other Comments:** Belongs to one of the most venomous groups of scorpions. Widespread species. **Status- IUCN: LOWER RISK -LEAST CONCERN.** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Research on venom for medical purposes. - **PHVA:** Pending. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** -. **Sources:** Pocock, R.I (1900) *The Fauna of British India, including Ceylon and Burma.* Arachnida. Today and Tomorrow's Printers and Publishers New Delhi. . Tikadar, B.K & D.B.Bastawade. (1983) *Fauna of India: Scorpions.* Arachnida. Vol. III: 1 -667. **Compilers:** T.J. Indira, V.M. Reddy, Mary Bai, K. Bano, P. Ahimaz, R. Bhanumathi.

**50. *Microcerotermes fletcheri* Holmgren & Holmgren -- VU (A1a, 1c; B1, 2a, 2b, 2c) -- Order /Family:** Isoptera / Termitidae. **Taxonomic status:** Species. **Habit:** Leaf litter feeder, tree bark feeder. **Habitat:** Trees stem dwelling on cashew, arboreal. **Global Distribution:** India, Bangladesh, Pakistan, Bhutan. **Current Regional Distribution:** Southern India. - **Elevation:** up to 600 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Many (Karnataka, Andhra Pradesh, Kerala, Tamil Nadu); Fragmented. **Population Trends:** - **% Decline:** 30 %. - **Time / Rate (Yrs or gens):** 10 yrs. . - **No. of Mature Individuals:** Not known. **Global Population:** Gradual decline. **Regional Population:** Continuing decline observed. **Data Quality:** General field study. **Recent Field Studies:** D. Rajagopal, 1973-97 in southern India. **Threats:** Loss of habitat; Human interference. **Trade:** No. **Other Comments:** It has association with Cashew Tree, *Shorea robusta* and other plantations. Not commonly seen in plains but mostly in coastal areas. **Status- IUCN: VULNERABLE (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on:** A1a, 1c (Observed population reduction due to decline in area, extent of occurrence & quality of habitat); B1, 2a, 2b, 2c (Restricted distribution, severely fragmented, . continuing decline in extent of occurrence, area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** : No. **Recommendations:** - **Research management:** Survey; Monitoring; Limiting factor management; Life history studies; Habitat management. - **PHVA:** Pending. **Captive Breeding Recommendation:** - **Captive breeding:** Level 3. - **Level of difficulty:** Very difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Rajagopal, D. (1983) Habit and habitat studies of ants of Karnataka, *J. Soil Biol. Ecol.* 3(2): 108-121. **Compilers:** D. Rajagopal, A.S. Vastrad, A.K. Chakravorty, K.G. Emiliamma, R. Mathew, B.A. Daniel.

**51. *Mysorella costigera* (Kuster) -- LRnt -- Order /Family:** Megagastropoda / Hydrobiidae. **Taxonomic status:** Species. **Habit:** Littoral/ Benthic. **Habitat:** Lentic, freshwater. **Global Distribution:** India and Sri Lanka. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 500 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - **% Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual decline. **Data Quality:** General field study; Indirect information. **Recent Field Studies:** : None. **Threats:** Loss of habitat; Pollution; Pesticides. **Trade:** No. **Other Comments:** Common species, size 7.5 mm. **Status- IUCN: LOWER RISK - NEAR THREATENED (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** : No. **Recommendations:** - **Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Moderately difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Sathyamurthy, S.T. (1960) The land and freshwater mollusca in the collection of Madras Government Museum, *Bulletin of Government Museum Natural History*, Vol 1, No. 4. **Compilers:** R. Natarajan, M.B. Rangunathan, V.R. Punithavelu, S. Paulraj, . C. Gunasekaran, M.S. Ravichandran.

**52. *Nasutitermes indicola* Holmgren & Holmgren -- VU (A1a, 1c; B1, 2a, 2c) -- Order /Family:** Isoptera / Termitidae. **Taxonomic status:** Species. **Habit:** Leaf litter and bark feeder. **Habitat:** Trees, Arboreal. **Global Distribution:** Southern India and Sri Lanka. **Current Regional Distribution:** Southern India. - **Elevation:** Upto 1200 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Many; Fragmented. **Population Trends:** - **% Decline:** > 20%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing decline observed. **Data Quality:** General field study. **Recent Field Studies:** D. Rajagopal, 1975 -95 in Mudigere, Karnataka. **Threats:** Loss of habitat. **Trade:** No. **Other Comments:** Nests used in medicine for respiratory disorder (fumes are inhaled) The nest is built using fecal pellets of termites only. . **Status- IUCN: VULNERABLE (Nationally). DATA DEFICIENT (Globally).** - **Criteria based on:** A1a, 1c; (Observed population reduction due to decline in area, extent of occurrence and . quality of habitat); B1, 2a, 2c (Restricted distribution, severely fragmented and continued . decline in area of occupancy, extent of occurrence and habitat quality). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Habitat management. - **PHVA:** Pending. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** No. - **Names of facilities:** —. **Sources:** Rajagopal, D. (1983) Habit and habitat studies of termites of Karnataka, *J. Soil Biol. . Ecol.* 3(2): 108 -121. **Compilers:** D. Rajagopal, R. Mathew, B. A. Daniel, A.K. Chakravarthy, A.S. Vastrad.

**53. *Ocnerodrilus occidentalis* Soota and Julka -- EN (B1, 2c) -- Order /Family:** Lumbricina / Ocnerodrilidae. **Taxonomic status:** Species. **Habit:** Detritus feeder. **Habitat:** Marshy areas. **Global Distribution:** India, Pakistan; Sri Lanka; Singapore; China; Japan; Philippines; Mexico; Italy; Denmark; Greece; Central Asia Basin. . **Current Regional Distribution:** Southern India. - **Elevation:** 300 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 2 (Warangal in Andhra Pradesh). **Population Trends:** - **% Decline:** No change. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known (50 /m<sup>2</sup>). **Global Population:** No change observed. **Data Quality:** General field study; Informal field sightings. **Recent Field Studies:** M.V. Reddy 1992 -93 in Warangal. **Threats:** Loss of habitat; Drought. **Trade:** No. **Other Comments:** Warangal population has the highest density amongst all species of earthworms. **Status- IUCN: ENDANGERED (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on:** B1, 2c (Restricted distribution, limited locations, continuing decline in extent of occurrence, area of occupancy and /or

quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Taxonomic studies, Habitat management, Research for pharmaceutical properties. - **PHVA:** Pending. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** M.V. Reddy (1997) *Soil Biol.Ecol.* (in press). Stephenson, J. (1923) *Fauna of British India: Oligochaeta*. Today and Tomorrow's Printers and Publishers, New Delhi. . **Compilers:** M.V. Reddy, M. Mary Bai, T.J. Indira, P. Ahimaz, R Bhanumati.

**54. *Octochaetona serrata* (Gates) -- VU (B1, 2c, 2e) --** (Earthworm). **Order /Family:** Lumbricina / Octochaetidae. **Taxonomic status:** Species. **Habit:** Geophytophagus subsurface feeder (soil and soil organic matter feeder). **Habitat:** Reddish brown acidic soil (Red soil). **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribtuion:** Southern India. - **Elevation:** Plains, up to 500 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Many; restricted to red soil -Fragmented. **Population Trends:** - **% Decline:** 5% (GNP - Chennai) Localised as restricted population. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known (10 -15 / m<sup>2</sup> during monsoon Oct -Nov). **Global Population:** Gradual continuing decline. **Data Quality:** Census and monitoring (S. Ismail in GNP, 1980-83; Ismail *et.al.*, 1993-96). **Recent Field Studies:** M.V. Reddy, Warangal, 1989-94; S. Ismail, 1993-96 in Guindy NP. **Threats:** Human interference; Change in edaphic factors; Loss of habitat; Drought. **Trade:** No. **Other Comments:** Litter preferences; Vegetation cover -favoured; show diapause (non-obligatory) aestivation undergone; This species prefers acid soil -has calciferous glands; neutralises soil by their action. K. Bano has surveyed red soil in Karnataka and notfound it. **Status- IUCN:** VULNERABLE. - **Criteria based on:** B1, 2c, 2e (Restricted distribution, severely fragmented, continuing decline in extent of occurrence, area of occupancy and /or quality of habitat, and number of mature individuals). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Habitat management. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** Level 3 (Research and educational requirement). - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** Complete culture facilities available . - **Names of facilities:** Institute of Research in soil Biology and Biotechnology, The New College, Chennai - 600 014. The facility available for *Perionyx excavatus* and *Lampito mauritii* can also be extended to *O.serrata*. **Sources:** Ismail, S. and Murthy, V.A (1985) Distribution of Earthworms in Madras. *Proceedings of Indian Academy of Sciences* 94: 557-566. . Ismail, S., Ramakrishnan, C. and Anzera, M.M. (1990) Density and diversity in relation to the distribution of earthworm in Madras. *Proceeding. Indian Acad. Science.* 99(1): 73-78. . **Compilers:** S. Ismail, M.V. Reddy, K. Bano, Mary Bai, T.J. Indira, P. Ahimaz, R Bhanumathi.

**55. *Octonochaeta rosea* (Stephenson) -- LRnt --** Order /Family: Lumbricina / Megascolecidae. **Taxonomic status:** Species. **Habit:** Geophagus (soil feeder) . **Habitat:** Anecic in semi-arid areas. **Global Distribution:** Not known. **Current Regional Distribtuion:** Southern India. - **Elevation:** 300 - 500 m. - **Range (sq. km):** >20,000. - **Area Occupied (sq. km):** >2,000. - **Number of locations:** Many. **Population Trends:** - **% Decline:** Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** No change observed. **Data Quality:** Census and monitoring; Informal field sighting . **Recent Field Studies:** M.V. Reddy, 1992-93 at ICRISAT Farm near Hyderabad. **Threats:** Changes in edaphic factors; Human interference; Pesticides, Drought. **Trade:** No. **Other Comments:** This species has disappeared from the adjacent areas where modern agricultural practices are in operation. **Status- IUCN:** LOWER RISK NEAR THREATENED (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Habitat management, Limiting factor research . - **PHVA:** Pending. **Captive Breeding Recommendation:** . - **Captive breeding:** Pending. - **Level of difficulty:** Moderately difficult. **Existing Captive Programmes:** None . - **Names of facilities:** —. **Sources:** M.V. Reddy, M.Vikram, V.P.K. Kumar, V.R.Reddy, P.Balashursi, D.G. Tule, A.L.Cogle, and Hangawad (1995) Earthworm biomass response to soil management in semi-Arid tropcal agroecosystem. *Biology Fertility of soil.* 1: 317 -321. Julka J.M (1997) in literature. . **Compilers:** M.V. Reddy, K. Bano, T.J. Indira, M. Mary Bai, P. Ahimaz, R. Bhanumati.

**56. *Ocypoda ceratophthalma* -- LRnt --** (Ghost Crab). **Order /Family:** Decapoda / Ocypodida. **Taxonomic status:** Species. **Habit:** Burrowing. **Habitat:** Intertidal zone . **Global Distribution:** Indian coasts and coast of Africa to the Sandwich Island. **Current Regional Distribtuion:** Indian coast. - **Elevation:** Sea level. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - **% Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline. **Data Quality:** General field study (S. Krishnan, 1985); Indirect information. **Recent Field Studies:** None. **Threats:** Loss of habitat; Pollution; Human interference. **Trade:** No. **Other Comments:** S. Paulraj studied the relative growth, waterloss and autotomy in two species of Ocypoda crabs (*O. platytarsis* and *O. cordimana*). **Status- IUCN:** LOWER RISK - NEAR THREATENED (Nationally). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National(old cat.):** No. - **RDB, International (old cat.):** : No. **Recommendations:** - **Research management:** Survey . - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Very difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Alcock, A. (1968) Materials for a Carcinological fauna of India . **Compliers:** S. Paulraj, R. Natarajan, M.B. Ragnathan, K. Revathi, V.R. Punithavelu, . C. Gunasekaran.

**57. *Ocypoda cordimana* -- EN (B1, 2a, 2c) --** (Ghost crab) **Order /Family:** Decapoda / Ocypodidae. **Taxonomic status:** Species. **Habit:** Burrowing. **Habitat:** Intertidal zone. **Global Distribution:** India and Sri Lanka coasts. **Current Regional Distribtuion:** Indian coast. - **Elevation:** Sea level. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** 1 (Tamil Nadu). **Population Trends:** - **% Decline:** 20%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known . **Regional Population:** Restricted Distribution and continuing decline in population. **Data Quality:** General field study; Indirect information. **Recent Field Studies:** S. Krishnan, 1985 to till date in Madras. **Threats:** Pollution; Human interference; Loss of habitat. **Trade:** No. **Other Comments:** -. **Status- IUCN:** ENDANGERED (Nationally). **DATA DEFICIENT (Globally).** - **Criteria based on:** B1, 2a, 2c

(Restricted distribution, single location, continuing decline in extent of occurrence, and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Habitat management. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Very difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Alcock, A. (1968) *Materials for a carcinological fauna of India*. Paulraj, S. (1981) Studies on relative growth water loss and autotomy in two species of Ocypode crabs *O. platytarsis* and *O. cordimana*. **Compilers:** S. Paulraj, M.B. Ragnunathan, K. Revathi, J.T. Jothinayagam, V.R. Punithavelu, C. Gunasekaran, .

**58. *Ocypoda macrocera* -- EN (B1, 2b, 2c) --** (Ghost crab). **Order /Family:** Decapoda / Ocypodidae. **Taxonomic status:** Species. **Habit:** Burrowing. **Habitat:** Intertidal. **Global Distribution:** ENDEMIC to East coast of India. **Current Regional Distribution:** East coast of India. - **Elevation:** Sea level. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Many; Fragmented. **Population Trends:** - **% Decline:** 20%. - **Time / Rate (Yrs or gens):** 10. - **No. of Mature Individuals:** Not known. **Global Population:** Continuing decline. **Data Quality:** General field studies (Dr. S. Krishnan, 1985 in Madras); Indirect information. **Recent Field Studies:** None. **Threats:** Pollution; Human interference; Loss of habitat. **Trade:** No. **Other Comments:** Paulraj, S. (1981) Studies on Relative Growth Water Loss and Autotomy in two species of Ocypoda Crabs. *O. platytarsis* and *O. cordimana*, Ph.D., Thesis. **Status- IUCN:** ENDANGERED. - **Criteria based on:** B1, 2b, 2c (Restricted distribution, severely fragmented, continuing decline in extent of occurrence, area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Very difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Alcock, A. (1968) *Materials for a Carcinological Fauna of India*, . **Compilers:** S. Paulraj, M.B. Ragnunathan, K. Revathi, R. Natarajan, C. Gunasekaran.

**59. *Ocypoda platytarsis* -- VU (A1c) --** (Ghost crab). **Order /Family:** Decapoda / Ocypodidae. **Taxonomic status:** Species. **Habit:** Burrowing. **Habitat:** Intertidal zone. **Global Distribution:** Sri Lanka, India. **Current Regional Distribution:** East and west coast of India. - **Elevation:** Sea level. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Not known. **Population Trends:** - **% Decline:** 20%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing decline in population. **Data Quality:** General field study (S. Krishnan, 1985 in Madras); Indirect information. **Recent Field Studies:** None. **Threats:** Pollution; Human interference; Loss of habitat; Harvest for food. **Trade:** No. **Other Comments:** Eaten by local people for increasing lactation. **Status- IUCN:** VULNERABLE (Nationally). **DATA DEFICIENT (Globally)**. - **Criteria based on:** A1c (Population reduction due to decline in area, extent of occurrence and /or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Habitat management; Studies on medicinal value and food. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** No. - **Names of facilities:** —. **Sources:** Alcock, A. (1968) *Materials for a Carcinological Fauna of India*, . **Compilers:** S. Paulraj, M.B. Ragnunathan, K. Revathi, R. Natarajan, C. Gunasekaran.

**60. *Odontotermes brunneus* Hagen -- VU (A1a, 1c; B1, 2a, 2c) --** **Order /Family:** Isoptera / Termitidae. **Taxonomic status:** Species. **Habit:** Litter feeder. **Habitat:** Subterreanean. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 1,000 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Many locations (Karnataka, Tamil Nadu, Andhra Pradesh); Fragmented. - **Population Trends:** - **% Decline:** 20%. - **Time / Rate (Yrs or gens):** 10. - **No. of Mature Individuals:** Not known. **Global Population:** Continuing decline observed. **Data Quality:** General field study. **Recent Field Studies:** D. Rajagopal, 1975-96 in Karnataka. **Threats:** Human interference (Intensive crop cultivation); Loss of habitat. **Trade:** No. **Other Comments:** . **Status - IUCN:** VULNERABLE. - **Criteria based on:** A1a,1c (Observed population reduction due to decline in area, extent of occurrence and quality of habitat); B1, 2a, 2c (Restricted distribution, severely fragmented and . continued decline in area of occupancy extent of occurrence and quality of habitat) . - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Habitat management. - **PHVA:** Pending. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Rajagopal, D. (1983) Habit and habitat studies of termites in Karnataka, *J. Soil. Biol. Ecol.* 3(2): 108 -121. **Compilers:** D. Rajagopal, A.K. Chakravarthy, A.S. Vastrad, R. Mathew, B.A. Daniel.

**61. *Odontotermes wallonensis* (Wasmann) -- VU (B1, 2c) --** (Mound-building termite). **Termes obesus ssp. wallonensis** Wasmann. **Order /Family:** Isoptera / Termitidae. **Taxonomic status:** Species. **Habit:** Soil inhabiting and subterranean. **Habitat:** Red soil tracts of India, only in arid zone. **Global Distribution:** Southern India and parts of Central India including parts of Gujarat, Maharashtra, Madhya Pradesh, Orissa and Bihar. **Current Regional Distribution:** Southern India. - **Elevation:** About 1,000 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Many (Karnataka, Andhra Pradesh, Tamil Nadu); Fragmented. **Population Trends:** - **% Decline:** Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Decline not known, though restricted in distribution. **Data Quality:** General field study. **Recent Field Studies:** D. Rajagopal, 1975-96 in southern India. **Threats:** Loss of habitat through cultivation; Change in edaphic factors; Pesticides; Loss of habitat due to fragmentation. **Trade:** No. **Other Comments:** Completely absent in heavy rainfall, deep black soil areas in Karnataka and very much confined to the arid zones of redsoil of S. India. In N. India it is not found in the same habitat. Winged termites are eaten by local people but it is not a factor in the population decline currently. Not possible to culture artificially. **Status - IUCN:** VULNERABLE (Regionally -southern India). **DATA DEFICIENT (Globally)**. - **Criteria based on:** B1, 2c (Restricted distribution, severely fragmented, continuing decline in area of occupancy, extent of occurrence and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring. - **PHVA:** No. **Captive Breeding**

**Recommendations:** - **Captive breeding:** Level 3. - **Level of difficulty:** Very difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Chhotani, O.B. (1980) *Termite pests of Agriculture in the Indian region and their control*, Tech. Mono. , ZSI, Calcutta. Rajagopal, D. (1979) Ecological studies in mound-building termite. *Odontotermes wallonensis*, Ph.D. thesis, Univ. Agri. Sciences, Bangalore. Rajagopal, D. (1982) Mound Building Behaviour of *Odontotermes wallonensis*, *Sociobiol.* 17(3): 289-304. **Compilers:** D. Rajagopal, A.K. Chakravarthy, R. Mathew, A.S. Vastrad, B.A. Daniel.

**62. *Oecophylla smaragdina* (Fabricius) -- LRlc --** (*Formica smaragdina* Fabricius). (Red tree ant). **Order /Family:** Hymenoptera / Formicidae. **Taxonomic status:** Species. **Habit:** Carnivorous, honey dew and sugary sap feeder. **Habitat:** On mango, guava, coffee, cardamom, banana plants. **Global Distribution:** India, Myanmar, Sri Lanka, China, Malayan Subregion to Australia and New Guinea. **Current Regional Distribution:** Southern India. - **Elevation:** up to 2,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - **% Decline:** No change. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Stable. **Data Quality:** General field studies. **Recent Field Studies:** Mustak Ali, 1992 in Karnataka; A.K. Chakravarthy, 1983-96 in Karnataka; D. Rajagopal 1982-96 in Karnataka. **Threats:** Harvest for food. **Trade:** No. **Other Comments:** They cultivate homopterans in their subsidiary nests as biocontrol agents against black ants, termites and scale insects. **Status- IUCN:** LOWER RISK - LEAST CONCERN (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management; Monitoring. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** No. - **Names of facilities:** —. **Sources:** Rajagopal, D. and Ali, T.M.M.(1984) Predatory ants of the mound building termite, *Odontotermes wallonensis*(Wasmann) with special reference to predatory behaviour of *Leptogynes processionalis* (Jerdon) *J. Bombay nat. Hist. Soc.*81(3): 721-725. Ali, T.M.M. (1992) Ant Fauna of Karnataka, Part II *IUSSI Newsletter* 3: 1-9. **Compilers:** D. Rajagopal, R. Mathew, A.K.Chakravarthy, A.S. Vastrad, K.G. Emiliyamma, B.A. Daniel.

**63. *Paludomus monile* (Hanley) -- EN (B1, 2b) -- Order /Family:** Megagastropoda / Melaniidae. **Taxonomic status:** Species. **Habit:** Littoral / Benthic, attached to hard substances. **Habitat:** Lotic freshwater. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 2,500 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** 3. **Population Trends:** - **% Decline:** 20 %. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Continuing decline. **Data Quality:** General field study; Indirect information. **Recent Field Studies:** None. **Threats:** Loss of habitat; Pollution. **Trade:** No. **Other Comments:** Known to be carriers of cercarial parasites. **Status- IUCN:** ENDANGERED. - **Criteria based on: B1, 2b** ( Restricted distribution, limited locations, continuing decline in area of occupancy). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National(old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Habitat management; Life history studies. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Sathyamurthy, S.T. (1960). The Land and Freshwater Mollusca in the collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum..* **Compilers:** R. Natarajan, M.B. Ragnathan, S. Paulraj, K. Revati, V.R. Punithavelu, . C. Gunasekaran.

**64. *Paludomus stomatodon* Benson -- CR (B1, 2b) -- Order /Family:** Megagastropoda / Melaniidae. **Taxonomic status:** Species. **Habit:** Littoral/ Benthic, attached to hard substances. **Habitat:** Lotic freshwater. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 1,500 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 1 (Kottayam, Thiruvananthapuram in Kerala). **Population Trends:** - **% Decline:** 20 %. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Continuing decline in its highly restricted distribution. **Data Quality:** General field study. **Recent Field Studies:** None. **Threats:** Loss of habitat; Human interference. **Trade:** No. **Other Comments:** Restricted in Distribution. **Status- IUCN:** CRITICALLY ENDANGERED. - **Criteria based on: B1, 2b** ( Restricted distribution, single location, continuing decline in area of occupancy). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Habitat management; Limiting factor research. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** Pending. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Anantharaman, M. M.A.B. Project of the ecology, distribution and documentation of freshwater gastropod of Tamil Nadu and their cercarial fauna (1 Oct 1984 to 31 March 1988). Sathyamurthy, S.T. (1960). The Land and Freshwater Mollusca in the Collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum..* **Compilers:** R. Natarajan, M.B. Ragnathan, S. Paulraj, K. Revati, V.R. Punithavelu, . C. Gunasekaran .

**65. *Paludomus tanschaurica* Gmelin -- VU (A1c) -- Order /Family:** Megagastropoda / Melaniidae. **Taxonomic status:** Species. **Habit:** Littoral/ Benthic. **Habitat:** Lotic freshwater. **Global Distribution:** India and Sri Lanka. **Current Regional Distribution:** Southern India. - **Elevation:** 5,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** 4; Fragmented. **Population Trends:** - **% Decline:** 20 %. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing decline though widespread. **Data Quality:** General field study; Indirect information. **Recent Field Studies:** None. **Threats:** Loss of habitat; Pollution. **Trade:** —. **Other Comments:** Carrier of cercarial parasites. **Status- IUCN:** VULNERABLE (Regionally - southern India). **DATA DEFICIENT (Globally).** - **Criteria based on: A1c** (Population reduction due to decline in area, extent of occurrence and /or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Life history studies. - **PHVA:** No. **Captive Breeding Recs.** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Progs.:** None. - **Names of facilities:** —. **Sources:** Sathyamurthy, S.T. (1960). The Land and Freshwater Mollusca in the collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum.* **Compilers:** R. Natarajan, M.B. Ragnathan, S. Paulraj, K. Revati, V.R. Punithavelu, C. Gunasekaran.

**66. *Parreysia corrugata* (Lea) -- VU (B1, 2a, 2c) -- Order /Family:** Eulamellibranchiata / Unionidae. **Taxonomic status:** Species. **Habit:** Benthic, Filter feeder. **Habitat:** Lentic and lotic freshwater. **Global Distribution:** Throughout India. **Current Regional Distribution:** Southern India. - **Elevation:** About 1,000 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many (Gudur, Godavari river in Andhra Pradesh and in Tamil Nadu); Fragmented. **Population Trends:** - % Decline: 15%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Gradual continuing decline. **Data Quality:** General field study; Indirect information. **Recent Field Studies:** : None. **Threats:** Pollution; Pesticides; Loss of habitat. **Trade:** No. **Other Comments:** Not much known. All freshwater bivalves are under threat. **Status- IUCN:** **VULNERABLE (Regionally -southern India).** **DATA DEFICIENT (Globally).** - **Criteria based on:** B1, 2a, 2c (Restricted distribution, severely fragmented, continuing decline in extent of occurrence and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** : No. **Recommendations:** - **Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Moderately difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Sathyamurthy, S. T. (1960). The Land and Freshwater Mollusca in the collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum.*. **Compilers:** R. Natarajan, M.B. Rangunathan, S. Paulraj, M.S. Ravichandran, C.Gunasekaran, V.R. Punithavelu.

**67. *Perionyx excavatus* E.Perr -- LRnt -- (Indian blue earthworm). Order /Family:** Lumbricina / Megascolecidae. **Taxonomic status:** Species. **Habit:** Detritus feeder. **Habitat:** Epigeic. **Global Distribution:** Southeast Asia (including India, up to Japan / Australia). **Current Regional Distribution:** Southern India. - **Elevation:** Plains and up to 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - % Decline: No change. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** No change observed. **Data Quality:** Census Studies: (Karnataka); Informal field sightings (Orissa and A.P.). **Recent Field Studies:** K. Bano, 1989-92 in southern Karnataka. **Threats:** Change in edaphic factors; Loss of habitat. **Trade:** No. **Other Comments:** Kubro Bano thought this species to be helped by humans. Used commercially for vermiculture. Lifecycle worked out. A workshop on economic importance of this species is recommended. **Status- IUCN:** **LOWER RISK -NEAR THREATENED (Regionally -southern India).** **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Limiting factor research; Species association studies (intra- and inter). - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** Level 3. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** Yes. - **Names of facilities:** Vermiculture units at different places, institutes and private people. **Sources:** Julk, J.M. and B.K. Senapati (1987) Earthworms (Oligochaeta: Annelida) of Orissa, India. Miscellaneous publications of ZSI *Occasional paper No.92. pp.49.* Stephenson, J. (1923) *Fauna of British India: Oligochaeta.* Today and Tomorrow's Printers and Publishers, New Delhi. **Compilers:** Kubra Bano, M. Vikram Reddy, S. Ismail, Mary Bai, T.J. Indira, Ranjit Daniels, . P.T. Cherian, M.B. Rangunathan, S. Paulraj, M.S. Ravichandran, P. Ahimaz, . R. Bhanumathi.

**68. *Phyllogonostreptus nigrolabiatus* (Newport) -- LRnt -- (Large common millipede). Order /Family:** Spirostreptida / Harpagophoridae. **Taxonomic status:** Species. **Habit:** Soil and litter feeder. **Habitat:** Forest floor; litter heaps. **Global Distribution:** Throughout India. **Current Regional Distribution:** Southern India. - **Elevation:** Plains and up to 1,800 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - % Decline: Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known (10 -20 per m<sup>2</sup> during monsoon). **Global Population:** Not known. **Regional Population:** Trends not known. **Data Quality:** General field study. **Recent Field Studies:** K. Bano and Mary Bai, 1994-95 onwards in Karnataka and Tamil Nadu. **Threats:** Loss of habitat; Drought. **Trade:** No. **Other Comments:** It is a ubiquitous animal; soil and litter feeder; major decomposer of organic matter in its habitat. Whenever there is a loss of litter in its habitat it becomes phytophagous or dangerous to the crops. **Status- IUCN:** **LOWER RISK -NEAR THREATENED (Regionally -southern India).** **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Taxonomic and morphological genetic studies; Survey; Life history studies; Monitoring. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** Pending. - **Level of difficulty:** Moderately difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Attens C. (1936) *Thyropygus nigrolabiatus* (Newp). *Mem. Ind.Mus.* Vol.II p.259. . Demange, J.M (1991) *Materiaire pour servin A ure Revision Des Harpugophoridae. Mem.Mus. Nat..His.Natl.Vol.XXIV :* 190-95. **Compilers:** K. Bano, M. Mary Bai, M.V. Reddy, T.J. Indira, P. Ahimaz, R. Bhanumathi.

**69. *Pila globosa* (Swainson) -- VU (A1c) -- (Large apple snail). Order /Family:** Megagastropoda / Ampullaridae. **Taxonomic status:** Species. **Habit:** Field and algal mass. **Habitat:** Pond (Lentic freshwater). **Global Distribution:** Indian subcontinent. **Current Regional Distribution:** Southern India. - **Elevation:** 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many (Andhra Pradesh and parts of Tamil Nadu). **Population Trends:** - % Decline: 90%. - **Time / Rate (Yrs or gens):** 30 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing decline though wide spread. **Data Quality:** General field study; Indirect information. **Recent Field Studies:** M.B. Rangunathan and V.R. Punithavelu, 1996-97 in Madras. **Threats:** Loss of habitat; Pesticides; Pollution; Human interference; Harvest for food; Harvest for medicine; Collection for lab studies; Loss of food plants. **Trade:** Local; Domestic. **Other Comments:** *P. globosa* is more common in N. India. Collected in plenty for medicinal purpose (piles). **Status- IUCN:** **VULNERABLE (Regionally -southern India).** **DATA DEFICIENT (Globally).** - **Criteria based on:** A1c (Population reduction due to decline in area, extent of occurrence and /or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Studies on medicinal properties. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** No. - **Names of facilities:** --. **Sources:** . **Compilers:** R. Natarajan, M.B. Rangunathan, S. Paulraj, V.R. Punithavelu, Sathish Kumar, . C. Gunasekaran.

**70. *Pila virens* (Lamarck) -- VU (A1a, 1c; B1, 2a, 2c) -- Order /Family:** Megagastropoda / Ampullaridae. **Taxonomic status:** Species. **Habit:** Fields and stagnant water. **Habitat:** Pond (Lentic freshwater). **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** 5. **Population Trends:** - % Decline: 90 %. - **Time / Rate (Yrs or gens):** 30 years. - **No. of Mature Individuals:** Not known. **Global Population:** Continuing decline. **Data Quality:** General field study; Indirect information. **Recent Field Studies:** M.B. Ragunathan and V.R. Punithavelu, 1996-97 in Tamil Nadu. **Threats:** Loss of habitat; Pesticides; Pollution; Human interference; Loss of food plants. **Trade:** No. **Other Comments:** More common in southern India. Usually confused for *Pila globosa*. **Status- IUCN:** VULNERABLE. - **Criteria based on: B1, 2a, 2c** (Restricted distribution, limited locations, continuing decline in extent of occurrence and quality of habitat); **A1a, 1c** (Population reduction due to decline in extent of occurrence, area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Anantharaman, M. MAB Project: The Ecology Distribution and documentation of Freshwater Gastropods of Tamil Nadu and their Cerearial Fauna (1 Oct. 1984 - 31 Mar 1988). Sathyamurthy, S.T. (1960) The Land and Freshwater Mollusca in the collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum.* **Compilers:** R. Natarajan, M.B. Ragunathan, S. Paulraj, V.R. Punithavelu, Sathish Kumar, C. Gunasekaran.

**71. *Plagiolepis jerdonii* Forel -- LRlc -- Order /Family:** Hymenoptera / Formicidae. **Taxonomic status:** Species. **Habit:** Aphicolous (Aphids); Subterranean. **Habitat:** Commensal. **Global Distribution:** Throughout India. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 2,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - % Decline: No change (as it inhabits many types of habitats). - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Fairly stable; widely distributed and adaptable species. **Regional Population:** Stable. **Data Quality:** General field study. **Recent Field Studies:** Musthak Ali, 1992 in Karnataka. **Threats:** No. **Trade:** No. **Other Comments:** Often associated with homopterans in many types of habitats. However also found without homopterans as these are nectar feeders. **Status- IUCN:** LOWER RISK - LEAST CONCERN (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Life history studies. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** Level 3. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** No. - **Names of facilities:** —. **Sources:** Ali, T.M.M. (1992) Ants of Karnataka, *IUSSI Newsletter*. **Compilers:** D. Rajagopal, A.K. Chakravarthy, A.S. Vastrad, R. Mathew, B.A. Daniel.

**72. *Poeciloceris pictus* Fab -- LRlc -- Order /Family:** Orthoptera / Pyrgomorphidae. **Taxonomic status:** Species. **Habit:** Phytophagous. **Habitat:** Wasteland. **Global Distribution:** India, Pakistan. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 900 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many (Tamil Nadu, Karnataka, Maharashtra, Kerala). **Population Trends:** - % Decline: No decline. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** No decline. **Data Quality:** Indirect information. **Recent Field Studies:** None. **Threats:** Human interference; Collection for laboratory study (Harvest). **Trade:** No. **Other Comments:** Weed killer. **Status - IUCN:** LOWER RISK -LEAST CONCERN (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Limiting factor research. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** COPR (1982) *Centre for Overseas Pest Research*. The Locust and grasshopper agricultural manual. **Compilers:** A.S. Vastrad, R.J.R. Daniels, R. Mathew, B.A. Daniel, C. Gunasekaran.

**73. *Polydrepanum tamilum* Carl -- LRnt -- (Millipede). Order /Family:** Polydesmida / Paradoxosomatidae. **Taxonomic status:** Species. **Habit:** Litter feeding. **Habitat:** Litter and soil. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Karnataka, Tamil Nadu. - **Elevation:** 1,000 - 2,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** Many. **Population Trends:** - % Decline: Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known (5 -10 / m<sup>2</sup>). **Global Population:** Not known. **Data Quality:** General field study; Informal field sighting; . **Recent Field Studies:** K. Banu, 1994-95, Karnataka. **Threats:** Climate; Loss of habitat; Drought. **Trade:** No. **Other Comments:** . **Status- IUCN:** LOWER RISK -NEAR THREATENED- - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Carl, J.(1932) Diplopoda aus sud. Indien and Ceylon.1.Teil polydesmoidea. *Ann.Soc.Zool.Sui.Musa. His.Natl. Geneve.* . Jeekal,C.A.W. (1980) Some little known poudosomatidae from India and Ceylon with the description of four new genera. (Diplopoda-Polydesmida). *Beurfortia:* 30(8): 175 -177. **Compilers:** K. Bano, M. Mary Bai, V.M. Reddy, T.J. Indra, P. Ahimaz, R. Bhanumathi.

**74. *Psilacrum convexa* (Cherian) -- CR (B1, 2a, 2b, 2c) -- (*Javanosenis convexa* Cherian). Order /Family:** Diptera / Chloropidae. **Taxonomic status:** Species. **Habit:** On leaves of shrubs. **Habitat:** Evergreen forest. **Global Distribution:** ENDEMIC to Southern India. **Current Regional Distribution:** Idukki. - **Elevation:** About 900 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 1 (Idukki). **Population Trends:** - % Decline: Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Population trend not observed. **Data Quality:** Census and population monitoring. **Recent Field Studies:** P.T. Cherian, 1984 -95 in Idukki, Kerala. **Threats:** Loss of habitat. **Trade:** No. **Other Comments:** Not collected since first recorded in 1985. The habitat is gradually being destroyed because of the development of Idukki district head quarters. **Status- IUCN:** CRITICALLY

**ENDANGERED- Criteria based on: B1, 2a, 2b, 2c** (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Life history studies. - **PHVA:** Pending. **Captive Breeding Recommendations:** . - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Cherian, P.T. (1990) *Hexapoda* 2(1): 18 -19. **Compilers:** P.T. Cherian, K.V. Lakshminarayana, K.G. Emiliyamma, B.A. Daniel.

**75. *Sechelleptus importatus* Demange 1977 -- CR (B1, 2c) --** (Millipede). **Order /Family:** Spirostreptida / Spirostrephidae. **Taxonomic status:** Species. **Habit:** Crop feeder. **Habitat:** Cultivated field. **Global Distribution:** Southern India and Seychelles Island. **Current Regional Distribution:** Southern India. - **Elevation:** 200 - 1,000 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 2 (South Kanara, Coorg, North Kanara, Bellary in Karnataka), F. **Population Trends:** - % Decline: 5%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known (4 -5/m<sup>2</sup>). **Global Population:** Not known. **Regional Population:** Gradual continuing decline. **Data Quality:** General field studies. **Recent Field Studies:** K. Bano 1994 -95 in Karnataka. **Threats:** Pollution; Pesticides, Loss of habitat. **Trade:** No. **Other Comments:** A study has to be undertaken to assess the ecological position of this animal as a pest in relation to the extent of damage it causes and the range of crops it damages as well as the range of host. **Status- IUCN:** **CRITICALLY ENDANGERED (Nationally). DATA DEFICIENT (Globally).** - **Criteria based on: B1, 2c** (Restricted distribution, limited location, continuing decline in area of occupancy, extent of occurrence and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring. - **PHVA:** Pending. **Captive Breeding Recommendation:** . - **Captive breeding:** Level 3. - **Level of difficulty:** Very difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Demange. (1977) Description de novells espcees despirostreptoidea (Myriapodes, Diplopodes) de l'Inde, dontune appartenant a un genre typiquement african. *Bull. Mus.Natn.Hist.nat.Paris.* 3ser. no.431. Zoologie. 301: 237-242. **Compilers:** K. Bano, T.J. Indira, Mary Bai, P. Ahimaz, R. Bhanumathi.

**76. *Speculitermes sinhalensis* Roonwal & Sen-Sarma -- EN (B1, 2c) --** **Order /Family:** Isoptera / Termitidae. **Taxonomic status:** Species. **Habit:** Detritus feeder. **Habitat:** Subterranean (Cultivated and uncultivated patches). **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Karnataka. - **Elevation:** 50 - 1,000 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** Many; Fragmented. **Population Trends:** - % Decline: May be declining. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** General field studies. . **Recent Field Studies:** D. Rajagopal, 1975-95 in Karnataka. **Threats:** Loss of habitat; Loss of habitat due to fragmentation. **Trade:** No. **Other Comments:** Since it is presently found in both cultivated and uncultivated areas, the species may not be so sensitive to disturbance; builds up the population very rapidly wherever organic matter is abundant although the colony size is small. **Status- IUCN:** **ENDANGERED.** - **Criteria based on: B1, 2c** (Restricted distribution, severely fragmented, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Habitat management; Life history studies; Limiting factor management. - **PHVA:** Pending. **Captive Breeding Recommendation:** . - **Captive breeding:** Level 3. - **Level of difficulty:** Very difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Rajagopal, D. (1983) Habit and habitat studies of some termites from Karnataka, *J. Soil Biol. Ecol.* 3(2): 108-121. **Compilers:** D. Rajagopal, A.K. Chakravarthy, A.S. Vastrad, R. Mathew, B.A. Daniel.

**77. *Strandesia bicornuta* (Hartman) -- EN (B1, 2a) --** **Order /Family:** Podocopida (Ostracoda) / Cyprididae. **Taxonomic status:** Species. **Habit:** Littoral / Benthic. **Habitat:** Benthic lentic freshwater. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 2,000 M. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 2 (Travancorei in Kerala; Goa); Fragmented. **Population Trends:** - % Decline: 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Continuing gradual decline observed. **Data Quality:** General field study; (M.B. Raghunathan, 1977-83 and K. Revathi, 1982-85 in Madras); Indirect information. **Recent Field Studies:** M.B. Raghunathan, 1993-till date In freshwater bodies of Chengalpet Dist. Sunny George, 1988-94 in Kerala. **Threats:** Loss of habitat; Pollution; Human interference. **Trade:** No. **Other Comments:** Water bodies in urban areas are desilted for commercial purposes and in rural areas for agriculture. **Status- IUCN:** **ENDANGERED.** - **Criteria based on: B1, 2a** (Restricted distribution, few fragmented locations, continuing decline in extent of occurrence). **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive Breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** George,S. (1993) Ostracods of Kerala, *Ph.D. thesis, Calicut University, Calicut.* Victor, R. and C.H. Fernando, (1979) The Freshwater Ostracods of India, *Records of the ZSI* Vol. 74 (Part 2) pp. 147-242. **Compilers:** S. Paulraj, M.B. Raghunathan, K. Revathi, J.T. Jothinayagam, M. Ramalingam, Sathish Kumar, V.R. Punithavelu.

**78. *Strandesia elongata* (Hartman) -- EN (B1, 2a) --** **Order /Family:** Podocopida (Ostracoda) / Cyprididae. **Taxonomic status:** Species. **Habit:** Littoral / Benthic. **Habitat:** Benthic lentic freshwater. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 1,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 10 (Trichy Dist., Madurai district, Madras, Arakonam, Pondicherry Karaikal in Tamil Nadu; Doublabad, Korva in Andhra Pradesh, Thiruvananthapuram in Kerala, Goa); Fragmented. **Population Trends:** - % Decline: 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Continuing gradual decline observed. **Data Quality:** General field study (M.B. Raghunathan, 1977-83 and K. Revathi, 1982-85 in Madras); Indirect information. **Recent Field Studies:** M.B. Raghunathan, 1993 - present In freshwater bodies of Chengalpet district. Sunny George, 1988 - 1994 in Kerala. **Threats:** Loss of habitat; Pollution; Human interference. **Trade:** No. **Other Comments:** Waterbodies in urban areas are desilted for commercial purposes and in rural areas for agriculture. **Status- IUCN:** **ENDANGERED.** - **Criteria based on: B1, 2a** (Restricted distribution, Severely

fragmented, continuing decline in extent of occurrence). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** George, S. (1993) Ostracods of Kerala, *Ph.D. thesis, Calicut University*, Calicut. Victor, R. and C.H. Fernando, (1979) The Freshwater Ostracods of India, *Records of the ZSI* Vol. 74 (Part 2) pp. 147-242. **Compilers:** S. Paulraj, M.B. Raghunathan, K. Revathi, J.T. Jothinayagam, M. Ramalingam, Sathish Kumar, V.R. Punithavelu.

**79. *Strandesia flavescens* (Klie) -- EN (B1, 2a) -- Order /Family:** Podocopida (Ostracoda) / Cyprididae.

**Taxonomic status:** Species. **Habit:** Littoral / Benthic. **Habitat:** Benthic lentic freshwater. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 500 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 2 (Ramnad and Madurai district). **Population Trends:** - % **Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Continuing gradual decline observed in the species restricted habitat. **Data Quality:** General field study (M.B. Raghunathan, 1977-83 and K. Revathi, 1982-85 in Madras); Indirect information. **Recent Field Studies:** M.B. Raghunathan, 1993-till date in freshwater bodies of Chengalpet Dist. Sunny George, 1988-1994 in Kerala. **Threats:** Loss of habitat; Pollution; Human interference. **Trade:** No. **Other Comments:** Waterbodies in urban areas are desilted for commercial purposes and in rural areas for agriculture. **Status- IUCN:** ENDANGERED. - **Criteria based on:** B1, 2a (Restricted distribution, limited location, continuing decline in extent of occurrence). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** George, S. (1993) Ostracods of Kerala, *Ph.D. thesis, Calicut University*, Calicut. Victor, R. and C.H. Fernando, (1979) The Freshwater Ostracods of India, *Records of the ZSI* Vol. 74 (Part 2) pp. 147-242. **Compilers:** S. Paulraj, M.B. Raghunathan, K. Revathi, J.T. Jothirayagam, M. Ramalingam, Sathish Kumar, V.R. Punithavelu.

**80. *Strandesia indica* (Hartman) -- VU (B1, 2a, 2c) -- Order /Family:** Podocopida (Ostracoda) / Cyprididae.

**Taxonomic status:** Species. **Habit:** Littoral. **Habitat:** Benthic lentic freshwater. **Global Distribution:** Southern, western & eastern India. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 500 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** < 2000. - **Number of locations:** 5 (Madras in Tamil Nadu; Thiruvananthapuram in Kerala; Pondicherry); . Fragmented. **Population Trends:** - % **Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing gradual decline observed. **Data Quality:** General field study (M.B. Raghunathan, 1977-83 and K. Revathi, 1982-85 in Madras); Indirect information. **Recent Field Studies:** M.B. Raghunathan, 1993-till date in freshwater bodies of Chengalpet Dist. Sunny George, 1988-94 in Kerala. **Threats:** Loss of habitat; Pollution; Human interference. **Trade:** No. **Other Comments:** Water bodies in urban areas are desilted for commercial purposes and in rural areas for agriculture. **Status- IUCN:** VULNERABLE (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** B1, 2a, 2c (Restricted distribution, limited location, fragmented, continuing decline in extent of occurrence, and /or area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** George, S. (1993) Ostracods of Kerala, *Ph.D. thesis, Calicut University*, Calicut. Victor, R. and Fernando, C.H. (1979) The Freshwater Ostracods of India, *Records of the ZSI* Vol. 74 (Part 2) pp. 147-242. **Compilers:** S. Paulraj, M.B. Raghunathan, K. Revathi, J.T. Jothinayagam, M. Ramalingam, Sathish Kumar, V.R. Punithavelu.

**81. *Strandesia labiata* (Hartman) -- LRnt -- Order /Family:** Podocopida (Ostracoda) / Cyprididae. **Taxonomic**

**status:** Species. **Habit:** Littoral / Benthic. **Habitat:** Benthic lentic freshwater. . **Global Distribution:** Southern, western & eastern India. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 3,000 m. - **Range (sq. km):** > 20,000. - **Area Occupied (sq. km):** > 2,000. - **Number of locations:** 8 (Bombay in Maharashtra, Travancore in Kerala, Palni Hills, Kodaikonal. Hills, Nilgiris Hills and Madras in Tamil Nadu, Hyderabad in Andhra Pradesh); Fragmented. **Population Trends:** - % **Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing gradual decline observed. **Data Quality:** General field study (M.B. Raghunathan, 1977-83 and K. Revathi, 1982-85 in Madras); Indirect information. **Recent Field Studies:** M.B. Raghunathan, 1993-till date in freshwater bodies of Chengalpet district. Sunny George, 1988-94 in Kerala. **Threats:** Loss of habitat; Pollution; Human interference. **Trade:** No. **Other Comments:** Water bodies in urban areas are desilted for commercial purposes and in rural areas for agriculture. **Status- IUCN:** LOWER RISK - NEAR THREATENED (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** George, S. (1993) Ostracods of Kerala, *Ph.D. thesis, Calicut University*, Calicut. Victor, R. and Fernando, C.H. (1979) The Freshwater Ostracods of India, *Records of the ZSI* Vol. 74 (Part 2) pp. 147-242. **Compilers:** S. Paulraj, M.B. Raghunathan, K. Revathi, J.T. Jothirayagam, M. Ramalingam, Sathish Kumar, V.R. Punithavelu.

**82. *Strandesia purpurascens* (Brady) -- EN (B1, 2a, 2c) -- Order /Family:** Podocopida (Ostracoda) /

Cyprididae. **Taxonomic status:** Species. **Habit:** Littoral/ Benthic. **Habitat:** Benthic lentic freshwater. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** Up to 500 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 2 (Ramnad and Madurai Districts in Tamil Nadu). **Population Trends:** - % **Decline:** 10%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing gradual decline observed. **Data Quality:** General field



study (M.B. Raghunathan, 1977-83 and K. Revathi, 1982-85 in Madras); Indirect information. **Recent Field Studies:** M.B. Raghunathan, 1993-present in freshwater bodies of Chengalpet Dist. Sunny George, 1988-94 in Kerala. **Threats:** Loss of habitat; Pollution; Human interference. **Trade:** No. **Other Comments:** Water bodies in urban areas are desilted for commercial purposes and in rural areas for agriculture. **Status- IUCN: ENDANGERED**. - **Criteria based on: B1, 2a, 2c** (Restricted distribution, Limited location, continuing decline in extent of occurrence, and /or area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Habitat management. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** George, S. (1993) Ostracods of Kerala, *Ph.D. thesis, Calicut University, Calicut*. Victor, R. and C.H. Fernando, C.H. (1979) The Freshwater Ostracods of India, *Records of the ZSI Vol. 74 (Part 2) pp. 147-242*. **Compilers:** S. Paulraj, M.B. Raghunathan, K. Revathi, J.T. Jothinayagam, M. Ramalingam, Sathish Kumar, V.R. Punithavelu.

**83. *Streptogonopus jerdoni* (Pocock) -- EN (B1, 2c) -- (Millipede). Order /Family:** Polydesmida / Paradoxosomatidae. **Taxonomic status:** Species. **Habit:** Phytophagous feeders, Fungivorous. **Habitat:** Cultivated fields. **Global Distribution:** Not known. **Current Regional Distribution:** Southern India. - **Elevation:** 200 -1,000 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** 5 (Karnataka). **Population Trends:** - % **Decline:** No change. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known (500 -1,000/m2 in each microhabitat). **Global Population:** Not known. **Regional Population:** No change. **Data Quality:** Census and monitoring; General field study (Allens 1936, Madras). **Recent Field Studies:** K. Bano, 1994-95 in Chitradurga, Dharwad, North Kanara, South Kanara, Shimoga. **Threats:** Human interference; Drought. **Trade:** No. **Other Comments:** The population consists of only female individuals so it is surmised that the animal is parthenogenically breeding; hence survey and biological studies to find out the male- female ratio is required. **Status- IUCN: ENDANGERED (Regionally -southern India). DATA DEFICIENT (Globally).** - **Criteria based on: B1, 2c** (Restricted distribution, limited locations, continuing decline in extent of occurrence, area of occupancy and /or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Taxonomic and morphological genetic studies; Monitoring; Life history studies. - **PHVA:** Pending. **Captive Breeding Recommendation:** - **Captive breeding:** Level 3. - **Level of difficulty:** Moderately difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Attems, C. (1936) Diplopoda of India. *Mem.Ind. Mus.* 11: 216. **Compilers:** M. Mary Bai, K. Bano, M.V. Reddy, T.J. Indira, P. Ahimaz, R. Bhanumathi.

**84. *Sulcospira hugeli* (Philippi) -- EN (B1, 2a, 2c) -- Order/ Family:** Megagastropoda/ Melanitidae. **Taxonomic status:** Species. **Habit:** Attached to substratum. **Habitat:** Lotic freshwater. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** ca. 2,500 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** 3 (Wynad, Lohen in Kerala; Cauvery River in Karnataka and Tamil Nadu). **Population Trends:** - % **Decline:** 20%. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Continuing decline in the species restricted distribution. **Data Quality:** General field study (K.C. Jayaraman 1983, Cauvery survey). **Recent Field Studies:** None. **Threats:** Loss of habitat; Pollution. **Trade:** No. **Other Comments:** Cercarial intermediate host. **Status- IUCN: ENDANGERED.** - **Criteria based on: B1, 2a, 2c** (Restricted distribution, Limited location, continuing decline in extent of occurrence, and /or area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Habitat management. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive Breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Jayaraman, K. C., Venkateswaralu, T. Ragunathan, M. B. (1983). A Survey of River Cauvery. *Records of ZSI, occasional paper no. 38*. Sathyamurthy, S. T. (1960). The Land and Freshwater Mollusca in the collection of the Madras Central Museum, *Bulletin of Madras Central Museum*.. **Compilers:** R. Natarajan, M.B. Ragunathan, S. Paulraj, V.R. Punithavelu, C. Gunasekaran, Sathish Kumar.

**85. *Synectrychotes calimerei* Livingstone & Murugan 1987 -- CR (B1, 2c) -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Underneath barks. **Habitat:** Scrub jungle. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 10 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 1 (Point Calimere, Tamil Nadu). **Population Trends:** - % **Decline:** Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** General field studies, (Murugan & Livingstone 1983 in Point Calimere). **Recent Field Studies:** None. **Threats:** Human interference (man made fire); Loss of habitat; Browsing. **Trade:** No. **Other Comments:** New genus in the sub family Ectrichotiinae. Monotypic. **Status- IUCN: CRITICALLY ENDANGERED.** - **Criteria based on: B1, 2c** (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Life history studies. - **PHVA:** No. **Captive Breeding Recommendation:** - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliata Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Livingstone, D and Murugan, C (1987) A new genus of Ectrichodiinae from Point Calimere, Southern India (Heteroptera : Reduviidae) *Uttar Pradesh J. Zool.* 7(1): 92 -95. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalenth, K.G. Emiliyamma, B.A. Daniel.

**86. *Tetramorium rossi* (Bolton) -- DD -- (*Triglyphothrix rossi* Bolton). Order /Family:** Hymenoptera / Formicidae. **Taxonomic status:** Species. **Habit:** Not known. **Habitat:** Not known. **Global Distribution:** ENDEMIC to Southern India. **Current Regional Distribution:** Kerala. - **Elevation:** Not known. - **Range (sq. km):** Not known. - **Area Occupied (sq. km):** Not known. - **Number of locations:** 1 (Munnar). **Population Trends:** - % **Decline:** Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Data Quality:** General field studies; Informal field sighting. **Recent Field Studies:** S. Sheela, 1992-95. **Threats:** Not known. **Trade:** Not known. **Other Comments:** . **Status- IUCN: DATA DEFICIENT.** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No.

- RDB, National (old cat.): No. - RDB, International (old cat.): No. Recommendations: - Research management: Survey; Monitoring; Life history studies. - PHVA: Pending. Captive Breeding Recommendations: - Captive breeding: No. - Level of difficulty: Not known. Existing Captive Programmes: None. - Names of facilities: —. Sources: Bolton, B. (1976) The ant tribe Tetramorini (Hymenoptera: Formicidae) constituent genera, review of smaller genera and revision of *Triglyphothrix* Forel. *Bull. Br.Mus. (Nat. Hist) ent.* 34: 281-379. . Sheela, S. (1995) Unpublished data. . Compilers: P.T. Cherian, R. Mathew, B.A. Daniel, A.K. Chakravarthy.

**87. *Tetraoponera aitkeni* (Forel) -- LRlc --** (*Sima aitkeni* Forel). Order /Family: Hymenoptera / Formicidae. Taxonomic status: Species. Habit: Arboreal species. Habitat: Arid zone (*Acacia* sp.) . Global Distribution: India and Sri Lanka. Current Regional Distribution: Southern India. - Elevation: 800 m. - Range (sq. km): > 20,000. - Area Occupied (sq. km): > 2,000 (about 50% of the extent of occurrence). - Number of locations: Many. Population Trends: - % Decline: Stable. - Time / Rate (Yrs or gens): Not known. - No. of Mature Individuals: Not known. Global Population: Not known. Regional Population: No change observed. Data Quality: Census and monitoring studies. Recent Field Studies: Mustak Ali, 1970-90 in Karnataka. Threats: No. Trade: No. Other Comments: Stenophagic, may be used in local, traditional and ayurvedic medicine. Status- IUCN: LOWER RISK -LEAST CONCERN (Regionally -southern India). DATA DEFICIENT (Globally). - Criteria based on: Not applicable. - CITES: No. - IWPA (1972; 91): No. - RDB, National (old cat.): No. - RDB, International (old cat.): No. Recommendations: - Research management: Monitoring; Life history studies. - PHVA: No. Captive Breeding Recommendation: - Captive breeding: No. - Level of difficulty: Not known. Existing Captive Programmes: None. - Names of facilities: —. Sources: Ali, T.M.M. (1992) Ant Fauna of Karnataka II, *IUSI Newsletter*, 6(1&2): 1-9. Compilers: D. Rajagopal, A.K. Chakravarthy, R. Mathew, A.S. Vastrad, B.A. Daniel. .

**88. *Thelyphonus sepiaris* -- LRnt --** (Whip scorpion). Order /Family: Uropygi/ Thelyphonidae. Taxonomic status: Species. Habit: Nocturnal, carnivorous. Habitat: Scrub forest and open land. Global Distribution: Southern India and Sri Lanka. Current Regional Distribution: Southern India. - Elevation: Up to 1,300 m. - Range (sq. km): > 20,000. - Area Occupied (sq. km): > 2,000. - Number of locations: Many (Anamalais, Nilgiris, Shevaroy Hills in Yercaud). Population Trends: - % Decline: 10% . - Time / Rate (Yrs or gens): 10 years. - No. of Mature Individuals: Not known. Global Population: Not known. Regional Population: Gradual continuing decline. Data Quality: General field studies; Informal field sightings (P. Ahimaz, 1978, MSPT at GNP;1984, at Mundanthurai,WS. Thirunelveli; P. Ahimaz and Bhanumathi, WWF, 1989 at GNP, Madras). Recent Field Studies: ZSI, 1995 in Kathupakkam Agri fields near Tambaram, Madras). P. Ahimaz, WWF, 1996 at MCC, Tamburam, Madras. Threats: Loss of habitat. Trade: No. Other Comments: Common name is misleading since the animal lacks a stinger. Although the speci-men at hand has been positively identified, taxonomic studies may be required due to the doubtful distribution of this species elsewhere. Status- IUCN: LOWER RISK - NEAR THREATENED (Nationally). DATA DEFICIENT (Globally). - Criteria based on: Not applicable. - CITES: No. - IWPA (1972; 91): No. - RDB, National (old cat.): No. - RDB, International (old cat.): No. Recommendations: - Research management: Monitoring; Survey; Life history studies. - PHVA: Pending. Captive Breeding Recommendation: - Captive breeding: No. - Level of difficulty: Least difficult. Existing Captive Programmes: None. - Names of facilities: —. Sources: Pocock, R. I. (1930) *The Fauna of British India including Ceylon and Burma*. Arachnida. Today and Tomorrow's Printers and Publishers, New Delhi. Compilers: T.J. Indira, M.V. Reddy, P. Ahimaz, R. Bhanumathi, Mary Bai, K. Bano.

**89. *Tricimbomyia muzhiyarensis* -- CR (B1, 2c) --** Order /Family: Diptera / Chloropidae. Taxonomic status: Species. Habit: Not known. Habitat: Dense deciduous and semi-evergreen forests. Microhabitat Found on leaves of shrubs. Global Distribution: ENDEMIC to southern western ghats. Current Regional Distribution: Kerala. - Elevation: Above 100 m. - Range (sq. km): < 100. - Area Occupied (sq. km): < 10. - Number of locations: 1 (Muzhiyar Forest in Pattanamthitta district of Kerala). Population Trends: - % Decline: Not known. - Time / Rate (Yrs or gens): Not known. - No. of Mature Individuals: Not known. Global Population: No specimen recorded for 22 years. Trends not known. . Data Quality: Reliable census and population monitoring (P. T. Cherian, March 1975, December 1983, April 1987). Recent Field Studies: P.T. Cherian and party (ZDI) in 1990. Threats: Loss of habitat. Trade: No. Other Comments: Not found after type collection in 1975; attempts at collection on four occasions over 15 years in the same and similar ecosystem did not yield results. The original habitat was destroyed. Monotypic species which links two families (now merged). Status- IUCN: CRITICALLY ENDANGERED. - Criteria based on: B1, 2c (Restricted distribution, single location, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - CITES: No. - IWPA (1972; 91): No. - RDB, National (old cat.): No. - RDB, International (old cat.): No. Recommendations: - Research management: Survey; Life history studies. - PHVA: Pending. Captive Breeding Recommendation: - Captive breeding: No. - Level of difficulty: Very difficult. Existing Captive Programme: None. - Names of facilities: —. Sources: Cherian, P.T (1990) On some new genera of Chloropidae, *Oriental Insects* . Compilers: P.T. Cherian, A.S. Vastrad, R. Mathew, B.A. Daniel, K.V. Lakshminarayana, . C. Gunasekaran.

**90. *Trinervitermes biformis* (Wasman) -- VU (A1a, 1c; B1, 2c) --** Order /Family: Isoptera / Termitidae. Taxonomic status: Species. Habit: Grass and litter feeding. Habitat: Subterranean. Global Distribution: India, Sri Lanka, Pakistan. Current Regional Distribution: Southern India. - Elevation: 500 -2,000 m. . - Range (sq. km): > 20,000. - Area Occupied (sq. km): < 2,000 km. - Number of locations: Many; Fragmented. Population Trends: - % Decline: 30% . - Time / Rate (Yrs or gens): 10 years. - No. of Mature Individuals: Not known. Global Population: Not known. Regional Population: Gradual decline. Data Quality: General field studies (Chhotani, 1975-76 South India). Recent Field Studies: D. Rajagopal, 1975-95 in Karnataka. Threats: Loss of habitat; Pesticides. Trade: No. Other Comments: . Status- IUCN: VULNERABLE (Regionally -southern India). DATA DEFICIENT (Globally). Criteria based on: A1a, 1c (Observed population reduction due to decline in extent of occurrence, area of occupancy and/or quality of habitat); B1, 2c (Restricted distribution, severely . fragmented, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - CITES: No. - IWPA (1972; 91): No. - RDB, National (old cat.): No. - RDB, International (old cat.): : No. Recommendations: - Research management: Monitoring; Limiting factor management; Limiting factor research. - PHVA: Yes. Captive Breeding Recommendation: - Captive breeding: Level 3. - Level of difficulty: Very difficult. Existing

**Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Rajagopal, D. (1983) Habit and habitat Studies of some Termites of Karnataka, *J. Soil Biol. Ecol.* 3(2): 108-123. Chhotani, O.B. (1980) *Termite pest of Agriculture in the region and their control*, ZSI, Calcutta. **Compilers:** D. Rajagopal, A.K. Chakravarthy, A.S. Vastrad, R. Matthew, B.A. Daniel.

**91. *Truxalis indica* (T. Bol) -- EN (B1, 2c) -- (Short-horned grasshopper) Order /Family:** Orthoptera / Acrididae. **Taxonomic status:** Species. **Habit:** Graminivorous (specific to grass). **Habitat:** Grassland. **Global Distribution:** Southern India. **Current Regional Distribution:** Karnataka - Dharwad, Tamil Nadu. - **Elevation:** about 100 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** 7 (2 in Karnataka; 5 in Tamil Nadu) Fragmented. **Population Trends:** - % Decline: Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Restricted in distribution and fragmented. Population decline not known. **Data Quality:** Census (P. Kumar, 1984, 1986; A.S. Vastrad, 1984, 1986 in Dharwad). **Recent Field Studies:** Muralirangan *et al.*, 1993 in Tamil Nadu. **Threats:** Loss of habitat. **Trade:** No. **Other Comments:** It is very scarce in TN and Karnataka. Two individuals recorded in Dharwad. **Status- IUCN:** ENDANGERED (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** B1, 2c (Restricted distribution, severely fragmented, continuing decline in extent of occurrence, area of occupancy and/or quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Limiting factor research. - **PHVA:** Yes. **Captive Breeding Recommendations:** - **Captive breeding:** Level 3. - **Level of difficulty:** Least difficult. **Existing Captive Programme:** None. - **Names of facilities:** —. **Sources:** Kumar, P. (1991) *Hexapoda*, 3 (1): 53-70. Muralirangan, M.C., Suresh, P., Dang, P.P and Gill, G.S (1993) Observations on the grasshopper species diversity and distributional pattern in peninsular India.

**92. *Velitra neelai* Murugan and Livingstone 1987 -- VU (D2) -- Order /Family:** Hemiptera / Reduviidae. **Taxonomic status:** Species. **Habit:** Underneath barks. **Habitat:** Ever green Forest. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Southern India. - **Elevation:** 450 m. - **Range (sq. km):** < 100. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 1( Siruvani, Coimbatore district). **Population Trends:** - % Decline: Not known. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known. **Global Population:** . **Data Quality:** General field studies (C. Murugan & D. Livingstone, 1985 in Siruvani). **Recent Field Studies:** None. **Threats:** Not known. **Trade:** No. **Other Comments:** Fortnightly visits for 5 years (1983-88) did not yield a single specimen. Survey after 1994 also did not yield specimen. Restricted distribution in terms of elevation. **Status- IUCN:** VULNERABLE. - **Criteria based on:** D2 (Restricted population in less than 100 sq.Km area of occupancy and a single location). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Life history studies; Habitat management. - **PHVA:** No. **Captive Breeding Recommendation:** . - **Captive breeding:** Level 3. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Murugan, C. (1988) Biosystematics and Ecophysiology of the Tibiaroliata Assassin Bugs (Heteroptera: Reduviidae) of Southern India. Ph. D. thesis, Bharathiar University, Coimbatore. Murugan, C and Livingstone, D (1987) A new species of the genus *Viltra* Stal from Southern India (Heteroptera: Reduviidae: Acanthaspidinae) *J. Ent. Res.* 11(1) : 87-89. **Compilers:** D. Livingstone, C. Murugan, P.T. Cherian, P. Pugalenthii, K.G. Emiliyamma, . B.A. Daniel. .

**93. *Viviparus variata* (Frauenfeld) -- EN (B1, 2b, 2c) -- Order /Family:** Megagastropoda / Viviparidae. **Taxonomic status:** Species. **Habit:** Shallow water, Benthic. **Habitat:** Ponds, lentic freshwater. **Global Distribution:** Throughout India. **Current Regional Distribution:** Southern India. - **Elevation:** Below 500 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 500. - **Number of locations:** 8 ( Pondicherry, Tamil Nadu); Fragmented. **Population Trends:** - % Decline: 10 %. - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Not known. **Regional Population:** Continuing gradual decline. **Data Quality:** Museum studies (T. Sathyamurthy 1960 at Madras Museum; Anantharaman, 1980s); General field study. **Recent Field Studies:** M.B. Rangunathan and V.R. Punethavelu, 1996-97 in Chengalpet district. **Threats:** Loss of habitat; Pollution. **Trade:** No. **Other Comments:** No. **Status- IUCN:** ENDANGERED (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** B1, 2b, 2c (Restricted distribution, severely fragmented, continuing decline in extent of occurrence, and/or area of occupancy and quality of habitat). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey. - **PHVA:** No. **Captive Breeding Recommendations:** - **Captive breeding:** No. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Anantharaman, M. MAB Project: The Ecology Distribution and documentation of Freshwater Gastropods of Tamil Nadu and their Cercarial Fauna (1 Oct. 184 -31 Mar 1988). Sathyamurthy, S.T. (1960) The Land and Freshwater Mollusca in the Collection of the Madras Government Museum. *Bulletin of Madras Govt. Museum.* **Compilers:** R. Natarajan, M.B. Rangunathan, S. Paulraj, V.R. Punithavelu, C. Gunasekaran, Sathish Kumar.

**94. *Xenobolus acuticonus* Attems -- LRnt -- (Millipede). Order /Family:** Spirobolida / Trigonulidae. **Taxonomic status:** Species. **Habit:** Litter feeding leaves under barks, leaf litter, in between tree trunks and wherever moisture is present. **Habitat:** Wide range of habitats including urban and rural areas. **Global Distribution:** Not known. **Current regional dist:** Southern India. - **Elevation:** 1,400 m. - **Range (sq. km):** < 20,000. - **Area Occupied (sq. km):** < 2,000. - **Number of locations:** Many (Tamil Nadu). **Population Trends:** - % Decline: No change noticed. - **Time / Rate (Yrs or gens):** Not known. - **No. of Mature Individuals:** Not known (30 -40/m<sup>2</sup>). **Global Population:** Not known. **Regional Population:** Stable. **Data Quality:** General field study. **Recent Field Studies:** M. Mary Bai, ZSI in Tamil Nadu, 1994-95. **Threats:** Climate; Drought. **Trade:** No. **Other Comments:** This species is a nuisance during monsoon due to its large population. **Status- IUCN:** LOWER RISK - NEAR THREATENED (Regionally -southern India). **DATA DEFICIENT (Globally).** - **Criteria based on:** Not applicable. - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No. - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Monitoring; Survey (new areas). - **PHVA:** No. **Captive Breeding Recommendations:** . - **Captive breeding:** No. - **Level of difficulty:** Not known. **Existing Captive Programmes:** None. - **Names of facilities:** —. **Sources:** Attems, C. (1936) Diplopoda of India. *Mem.Ind. Mus.* 11: 303. **Compilers:** M. Mary Bai, K. Bano, M.V. Reddy, T.J. Indira, P. Ahimaz, R. Bhanumathi.

**95. *Zarytes squalina* (Bol.) -- CR (B1, 2a, 2b) -- Order /Family:** Orthoptera / Pyrgomorphidae. **Taxonomic status:** Species. **Habit:** Phytophagous. **Habitat:** Rocky scrub in forests. **Global Distribution:** ENDEMIC to southern India. **Current Regional Distribution:** Tamil Nadu and Karnataka. - **Elevation:** about 1,000 m. - **Range (sq. km):** < 5,000. - **Area Occupied (sq. km):** < 10. - **Number of locations:** 3; Fragmented. **Population Trends:** - % Decline: 10 -20% . - **Time / Rate (Yrs or gens):** 10 years. - **No. of Mature Individuals:** Not known. **Global Population:** Gradual continuing decline in population. **Data Quality:** General field studies. **Recent Field Studies:** M.C. Muralirangan, *et. al.*, 1993 in entire Tamil Nadu; Prasad Kumar and Virakthamath, 1991 in entire Karnataka; A.S. Vastrad, 1991 in northern Karnataka. **Threats:** Loss of habitat; Human interference. **Trade:** No. **Other Comments:** . **Status- IUCN:** CRITICALLY ENDANGERED. - **Criteria based on: B1, 2a, 2b** (Restricted distribution, severely fragmented, continuing decline in extent of occurrence and area of occupancy ). - **CITES:** No. - **IWPA (1972; 91):** No. - **RDB, National (old cat.):** No . - **RDB, International (old cat.):** No. **Recommendations:** - **Research management:** Survey; Monitoring; Limiting factor research; Life history studies. - **PHVA:** Yes. **Captive Breeding Recommendation:** . - **Captive breeding:** Level 3. - **Level of difficulty:** Least difficult. **Existing Captive Programmes:** None . - **Names of facilities:** —. **Sources:** Kumar, P. (1991) *Hexapoda*, 3(1): 53 -70. Muralirangan, M.C., Suresh,P., Dang, P.P. and Gill, G.S. (1993) Observations on the grasshopper species diversity and distributional pattern in peninsular India. *Entomologist*, 112(3&4): 201-210. Vastrad, A.S. (1991) Ecological distribution, lifeforms and food habits of . grasshoppers in Dhaward region, Karnataka, *Hexapoda*, 3(1): 94 -99. **Compilers:** D. Rajagopal, A.K. Chakravarthy, A.S. Vastrad, R. Mathew, B.A. Daniel.