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**IMPORTANT CONSERVATION RESEARCH
TOPICS ON TERRESTRIAL ARTHROPOD
SPECIES IN NEW ZEALAND**

by

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IMPORTANT CONSERVATION RESEARCH TOPICS ON TERRESTRIAL ARTHROPOD SPECIES OF NEW ZEALAND

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SUMMARY

New Zealand arthropod species and genera which require conservation research are identified. Although the list is incomplete, seventeen out of 40 topics have been noted as requiring urgent research and of these, 8 are considered extremely urgent. For each species there is a synopsis of distribution, conservation status and required research together with a ranking of the latter two. The location of the species in conservancies is noted.

1. INTRODUCTION

A list of important research topics occurs in Ramsay *et al.* (1988) who mention community and species based topics. This report addresses in more detail which invertebrate species need research attention and ranks their importance. The list is not exhaustive because so many species remain undescribed or undiscovered. It is intended therefore, to review the list periodically. The report concentrates on the protected species because the Department of Conservation (DOC) has a statutory obligation (Wildlife Amendment Act 1980) to protect them and hence undertake any research which might be necessary. A short list of the most urgent research topics occurs in Section 3.4.

2. METHODS

The common objective of research on all species is to supply management with the necessary advice to ensure the species' survival. I have what is known about distribution and any notable facts on ecology, what research is required, and its urgency. A summary list of the most urgent subjects for research occurs at the end. Some of the information mentioned in this report is unpublished and has been gleaned from discussions and correspondence with authorities mentioned in the text. Their affiliations and addresses occur in the acknowledgements. Otherwise all information on distribution, status and ecology has been taken from Ramsay *et al* (1988).

Where possible I have used official common names that occur in Ferro *et al* (1977) and noted the use of unofficial common names. After the scientific name, I have recorded the DOC conservancy(s) within whose boundaries the arthropod is known to occur.

The conservation status categories (where they have been decided) conform with the categories designated by the Survival Service Commission of the International Union for the Conservation of Nature (IUCN).

- Extinct:** taxa not located in the wild during the past 50 years.
- Endangered:** taxa whose populations are unlikely to survive unless conservation measures are taken.
- Vulnerable:** taxa with limited populations which could easily become endangered and whose ultimate security is not assured.
- Rare:** taxa with limited populations which are not vulnerable at present but which are at risk.

I have ranked the importance of research on each species on a scale of three. The scale relates to the species' conservation status and a subjective assessment of the urgency of work required:

1. Research required immediately, essential for securing the species against extinction (1+ = extremely urgent).
2. Research needed within two years but is essential to secure the species against extinction.
3. Research needed at some stage to guarantee against extinction.

3. RESEARCH TOPICS

3.1 Insecta

Order Orthoptera: Family Stenopelmatidae (= Anostomatidae, P. M. Johns pers. comm. - tree, ground and giant wetas).

Note : there is probably another new species (undescribed) recently found by the author occurring in the Kaikoura region which is neither *Deinacrida parva* (Kaikoura weta) nor *D. connectens* (alpine weta) (M. J. Meads pers. comm.).

Deinacrida carinata Southland conservancy (Herekopare weta - unofficial common name, rare): Confined to Herekopare Island, Foveaux Strait. Little ecological information is available. The population is presumably relatively secure because cats have been eradicated. **Research:** (rank = 3) Survey work is required to determine status on Herekopare Island and preferred habitat so that at least one other population can be established elsewhere.

Deinacrida fallai Northland conservancy (Poor Knights weta, rare) : Confined to the Poor Knights Islands. Some life-history data are available.

Research: (rank = 3) Habitat requirements in order to establish another population.

Deinacrida heteracantha Auckland conservancy (wetapunga, rare): Confined to Little Barrier Island, Hauraki Gulf, where it survives in the presence of Kiore (*Rattus exulans*) and, until recently, cats. The weta is not considered at risk but given that kiore occur there, this should be confirmed. Some life-history information is available.

Research: (rank = 3) Habitat requirements in order to establish another population.

***Deinacrida* sp.** Waikato conservancy (Mahoenui weta - unofficial common name, rare) : One population occurs at Mahoenui in the King Country in about 250 Ha of gorse and is said to be a different species (M. J. Meads and G.W. Ramsay, pers. comm.) from Wetapunga (Little Barrier Island weta). Ramsay is writing a review for the genus *Deinacrida* which he assures me will confirm the aforesaid. The risk of fire is the main threat to the species and the scientific and management objectives are to secure new populations.

Research: (rank = 3) Habitat requirements, distribution survey (within their present location and in surrounding districts), preferred food species, life history information and predation. Research on captive rearing was started by M. J. Meads (Ecology Division, DSIR) in December 1986 and field based research by the author in September 1988.

Deinacrida parva Nelson/Marlborough conservancy (Kaikoura weta, rare -unofficial common name): Previously thought to be endangered, has been found in new locations pointing to the urgent need to establish its conservation status through distribution survey (see also Meads 1989a). Little is known about its ecology.

Research: (rank = 1) Like the Mahoenui weta, the Kaikoura weta is known only from the mainland and therefore may be potentially subjected to the full range of threats such as habitat modification, predators, parasitism and competition. A distribution survey (unpublished) has been completed by M. J. Meads. However, more survey information is required to accurately determine the conservation status of the species.

Deinacrida rugosa Wellington and Nelson/Marlborough conservancies (Stephens Island weta, rare): Naturally occurs on Stephens and Mana Islands, Cook Strait, despite the presence of mice. However, a mouse eradication attempt on Mana Island has been started at the time of writing. The Wanganui population is probably extinct (P. M. Johns, Zoology Department, University of Canterbury pers. comm.). Some life history information is known (Meads and Moller 1978). The weta was introduced to Maud Island in 1978 where it has increased and expanded its distribution.

Research: (rank = 3) The introduced populations require regular, systematic monitoring. Work is required to determine what rate of re-introduction of new genetic material into artificially established small populations will yield a desirable level of diversity.

Deinacrida tibiospina Nelson/Marlborough conservancy (Nelson alpine weta - unofficial name, possibly rare ?) : Confined to areas above the forest in the mountains west of Nelson, Lakes Cobb and Lockett. Although scant ecological information is available it may be at risk rodent predation if in fact rodents occur at similar altitudes. Some work on their distribution has been carried out by Meads (1989b).

Research: (rank = 1) Potentially the same problems face *D. tibiospina* as the other mainland *Deinacrida* species. However, Meads (1989b) considers the weta is not in any danger. The most urgent research required is systematic distribution survey.

***Deinacrida* sp.** Waikato conservancy (this species may belong to a new genus) (Middle Island giant ground weta -unofficial common name). Probably a ground weta. Males have huge forward tusks extending from their mandibles which are apparently used to defend retreats (M. McIntyre, School of Biological Sciences, Victoria University pers. comm.). The species may be largely predatory and is only known from Middle Island, Mercury Group which is rodent free. However, little is known about its status since Middle Island and others have not yet been systematically searched.

Research: (rank = 1+) The weta's taxonomic and conservation status needs to be determined.

***Deinacrida* new sp.** Canterbury conservancy (mid-Canterbury bush weta - unofficial name, unknown status). No ecological information available. The weta was once known from mid Canterbury (G.W. Ramsay, pers. comm.). Regional Office (Department of Conservation) has conducted a search for it in 1989 (results not available at time of publication).

Research: (rank = unknown) as for Middle Island weta.

Hemideina ricta Canterbury conservancy (Banks peninsula weta -unofficial common name, rare) : to habitat remnants on Bank's Peninsula. Little ecological information available. The only known population occurs in a private reserve (P. M. Johns pers. comm.).

Research: (rank = 1) As for *Deinacrida tibiospina*.

***Hemiandrus* spp.** Otago, Wellington, Waikato. Three new species are known : one confined to the Cromwell chafer reserve, one from Levin (possibly a species confined to Horowhenua lowland soils) and one from the Mt Moehau reserve (Coromandel). The latter two species are known only from one specimen each. This is not to say they are endangered. Rather, survey work is needed to determine their status.

Research : (rank = unknown) Determine the distribution and status of the species.

Order Orthoptera: Family Acrididae (grasshoppers)

Brachaspis robustus Canterbury conservancy (robust grasshopper -unofficial common name, endangered/extinct): Until it was recently discovered in the McKenzie Basin, this species was known only from three specimens. Little ecological information available. A survey is being carried out by the Canterbury Conservancy Office (DOC), Christchurch.

Research: (rank =1) Depending on the results of the current survey, more survey work may be required.

Order Coleoptera :Family Caribidae (ground or scarab beetles)

Megadromus sp. Nelson/Marlborough conservancy (Picton and Port Underwood ground beetles - unofficial common name, possibly rare) : Known only from Picton and Port Underwood Saddle area and Arapawa Island (ie their original discovery sites). Several species of this genus exist in the above area. Their taxonomy must be clarified before their conservation status can be determined. Little ecological information is available and some populations may be at risk from habitat modification.

Research : (rank = 3) Research is required to design a suitable technique for survey which should be carried out as soon as possible. In conjunction with this work, collection for the taxonomic description of the genus should be carried out.

Mecodema laeviceps Otago conservancy (no common name) :Known only from Otarehau area of Ida Valley (Maniototo Ecological District) and may be endemic to this area. The beetle is found under big stones in tussock country. Nothing else is known.

Research: (rank = 2) As for *Megadromus*. It is essential that the status of this species is determined.

Mecodema chiltoni Otago conservancy (no common name): Known from central Otago (Eyre and Nevis Mountains). No ecological information is available.

Research: (rank = unknown) Survey to determine status and distribution.

Mecodema costellum Nelson/Marlborough conservancy (no common name): Occurs in very localised populations in eastern Marlborough and Nelson. No ecological information is available.

Research: (rank = unknown) as for *M. chiltoni*.

Family (stag beetles)

Note: The stag beetles of the genus *Dorcus* lend themselves to research at the generic level - see research under *D. ithaginus*.

Dorcus auriculatus Waikato conservancy (Coromandel stag beetle -unofficial common name, vulnerable): Known only from Mt Te Aroha but may occur around Thames. Formerly it was widespread in the Thames and the Waikato. Little ecological information is available. This species is threatened by habitat modification and introduced predators.

Research: (rank = 1) As for *Megadromus* species.

Dorcus ithaginus Auckland conservancy (Mokohinau stag beetle -unofficial common name, vulnerable): Known only from the Mokohinau Islands. Scant ecological information is available. Until recently it was thought to be extinct because of rodent predation. However, in 1984 it was rediscovered on a small isolated offshore stack (Stack H). This population is probably extremely small and to extinction.

Research: (rank = 1+) A survey of other possible habitat should be undertaken as soon as possible and, if necessary, a technique for captive breeding designed immediately so that a new population can be established. Allied work should be done on one of the more common members of this genus before starting on *D. ithaginus*. While this is being done enclosures in the wild should be set up and poisoned for rodents and other predators. The objective would be to enhance the population within the enclosures by releasing gravid females at the right time and site as determined from the research on wild populations of similar species. Enclosures which successfully produced gravid females could be used to supply other similarly protected areas.

Dorcus belmsii Southland conservancy (Helms' stag beetle, possibly extinct on Big South Cape): Only one has been collected (Watt 1975). The beetle is flightless and large bodied. Its status and distribution is unclear but it has been reported as "relatively common in Waitutu forest Fiordland" (Wildlife Service Fauna Survey Unit, pers. comm.). The species is possibly threatened by rodents on Big South Cape.

Research: (rank =1 ?) A survey of Big South Cape Island is required urgently to determine its status there and a comparison made with beetles to determine whether any affinities exist between the two populations.

Family Scarabaeidae (scarab beetles)

Prodontria lewisi Otago conservancy (Cromwell chafer, vulnerable): Confined to less than 100 hectares on flats at Cromwell, Central Otago. One population was recently lost due to a housing project. Some ecological information is available from Armstrong's (1988) M Sc thesis (Zoology Department, University of Otago). A special reserve was established for this species in 1983. However, the Cromwell chafer may be at risk from introduced predators including *Athene noctua* (little owl).

Research: (rank 3) Monitoring work is required and research recommendations in Armstrong's thesis should be followed.

Prodontria bicolorata (Given) Otago conservancy (Alexandra chafer -unofficial common name): Endemic to the Alexandra area and under immediate threat from airport extensions and land development for horticulture and housing. This flightless species depends on open, grassed areas and cushion plants. A survey in 1987 found only low numbers of beetles (Brian Patrick pers. comm.).

Research: (rank 1+) Survey is required to determine present distribution and recommend an appropriate area for reservation as was done with the Cromwell Chafer Reserve.

Prodontria setosa (Given), ***P. modesta*** (Broun) and ***P. pinguis*** (Given) Southland conservancy. Little is known about these species. Survey work is required to secure their protection because of the threat of land development (Brian Patrick pers. comm.).

Family Elateridae (click beetles)

Amychus candezei Canterbury conservancy (Chatham Island amychus -unofficial common name, rare/vulnerable): Confined to South East and the Sister Islands and one population on the main Chatham Island. There is scant ecological information available. The species is at risk from habitat modification and probably from introduced vertebrate predation although two populations occur on predator-free islands.

Research : (rank = 2) Design a survey technique to enable monitoring the offshore island populations and to determine the status of the main Chatham Island population.

Amychus granulatus Nelson/Marlborough conservancy (Cook Strait amychus - unofficial common name, rare) : Confined to The Brothers, Trios, Maud and Stephens Islands, Cook Strait. Scant ecological information is available.

Research : (rank = 3) : Design a survey technique to enable monitoring.

Note : a third undescribed Amychus species occurs on Great Island, Three Kings. Nothing is known about its ecology. Work is needed to verify its existence and to describe it.

Family Cerambycidae (longhorn beetles)

Xylotoles costatus Canterbury conservancy (Pitt Island, Chatham longhorn beetle - unofficial common name, possibly extinct) : Known only from Pitt Island, Islands but not found for over 50 years. Its presumed disappearance might reflect the lack of search effort. No ecological information exists but it is possibly at risk from introduced predators (cats and mice).

Research : (rank = 1+) A survey to determine the status of this beetle is required extremely urgently. Depending on the results of the survey, research will be required to captive breed beetles and determine habitat requirements with the aim of establishing another population.

Family Curculionidae (weevils)

Anagotus fairburni Northland, Auckland, Waikato, Wellington, Nelson/Marlborough and Southland conservancies (flax weevil -unofficial common name, unknown status) : Confined to the following offshore islands -Poor Knights (Northland), Little Barrier (Auckland), Aldermen Islands (Coromandel), Maud Island and Stephens Island (Cook Strait); alpine areas of the Tararua Ranges, Wellington. Possibly present on D'Urville and Trio Islands (Cook Strait), Motuahahara Island (Queen Charlotte Sound) and the islets off Stewart Island. Little ecological information is available.

Research: (rank = 3) Design a survey technique which will allow monitoring the species at various "at risk" locations.

Anagotus turbotti Northland (Turbott's weevil - unofficial common name, rare) : Confined to the Three Kings and Poor Knights Islands, Northland. Closely related species occur on Stephens Island, Cook Strait and outlying islands of Stewart Island. It was formerly present on the mainland (e.g. Puysegur Point, Fiordland) but is now thought to be extinct there. Little ecological information is available.

Research: (rank = 3) As for *A. fairburni*

Note : the *Hadramphus* genus lends itself to research at a generic level -see *H. stilbocarpace* research.

Hadramphus spinipennis Canterbury conservancy (Coxella weevil - -unofficial common name, endangered): Confined to small outlying islands in the Islands. Although it was once on Pitt Island, it was probably exterminated by introduced predators. Little ecological information is known.

Research: (rank =1+) Survey is urgently required to determine their status as is a study of habitat requirements to enable translocation and the establishment of new populations.

Hadrampbus stilbocarpae Southland conservancy (stilbocarpa weevil - unofficial common name, rare): Confined to small rat-free offshore islands in Foveaux Strait, Big South Cape Island and the Snares Islands. However, the weevil was probably exterminated on Big South Cape Island in 1962/63 by invading rats. A distinct population may persist near Puysegur Point. Little ecological information is available.

Research: (rank = 3) Survey of the Puysegur Point population. Taxonomic research is required to assess variability.

It would be advantageous if species of the genus *Hadrampbus* was worked on collectively. Specifically, while *H. spinipennis* and *H. tuberculatus* are being surveyed, a "safe" population of *H. stilbocarpae* should be studied to supply ecological information which could be used in planning the recovery of the other two species.

Hadrampbus tuberculatus Canterbury conservancy (Banks Peninsula speargrass weevil, possibly extinct): Once known from Banks Peninsula, the region between Oxford and Waimate, inland as far as the Rakaia Gorge and the foot-hills of Mt Hutt, Canterbury.

However, the species has not been reported for more than 50 years and was not found in a recent survey of Banks Peninsula (Johns 1986). On the other hand, other parts of their historic range have not been seriously searched.

Research: (rank = 1+) As for *H. spinipennis* -extremely urgent.

Heterexis seticostatus Southland conservancy (Campbell Island ribbed weevil - unofficial common name, rare/vulnerable): Confined to Campbell Island and consequently at risk from Norway rat predation. Little ecological information is available.

Research: (rank = 1) As for *H. spinipennis* - urgent.

Megacolobus sculpturatus Canterbury conservancy (Akaroa weevil - unofficial common name, possibly extinct): Known only from one specimen collected more than 100 years ago. No ecological information is available although it was probably a nocturnal fern feeder as are other members of the genus.

Research: (rank = 1+) A survey is urgently required to determine the species' status. A research plan is required based on the outcome of the survey.

Nothaldonus peacei Northland conservancy (Whangarei cryptorhynchine weevil - unofficial, common name, rare/vulnerable): It is known only from the Whangarei area but its conservation status unknown. The only ecological information known is that it is a wood-borer.

Research : (rank =1) Technically, this species is difficult to survey, hence research is required to design a survey technique before being carried out. Research should be planned on the basis of the survey results.

Oclandius laeviusculus Southland conservancy (subantarctic *Oclandius* weevil - unofficial common name, rare/vulnerable): Known from the Auckland Islands, the species is possibly threatened by mouse (*Mus domesticus*) predation on Auckland Island. It was discovered on Dent Island, (near Campbell Island) by Dr T. K. Crosby in 1984 and is probably present on Jacquemart Island. Little ecological information is available.

Research : (rank = 3) Monitor the Auckland Island population and survey the offshore islets off Campbell Island to see if they occur there.

Lyperobius buttoni Nelson/Marlborough, Wellington conservancies (speargrass weevil, rare in Wellington): Apparently the same species occurs in subalpine areas in Canterbury and Marlborough with one lowland coastal, fragmented population about the south Wellington coast. The latter population has been very seriously depleted by habitat destruction, modification and possibly rodent predation. A survey of the south Wellington coast sub-populations has been completed by Dr A. Beauchamp and written up as a report to the Department of Conservation (1989). Some ecological information is available from Bull (1967).

Research: (rank = 1 for the Wellington population) Further survey is required to determine if any more of the Wellington sub-populations still survive. A research project defining habitat requirements is required with the objective of establishing a "safe" population. Captive breeding of this variant might also be justified.

Order Lepidoptera: Family Geometridae

Asaphodes stinaria (Guenee) Otago and Southland conservancies (no common name, rare) Whereas it was once widespread and reasonably common from the middle of the North Island to southern Southland, today it is rarely found in a few localities including two in Otago-Southland. Its life history is unknown except that it is associated with grassy openings in forested areas. The status of the North Island population is unknown but it is considered very rare (Brian Patrick pers. comm.).

Research: (rank 2+) A suitable location for research occurs near Queenstown (Brian Patrick comm.). Life cycle characteristics especially with a view to determining habitat requirements, especially food species. Results from research on preferred food species will help survey throughout its previous range.

Xanthorhoe bulbulata (Guenee) Otago conservancy (no common name, possibly extinct): Formerly widespread and common in the grasslands of the eastern South Island from Marlborough to Southland. There has been only one specimen collected at Queenstown in 1979 the last 40 years. Nothing is known of its biology.

Research: (rank 1+) Survey the Queenstown area to the population size and immediate threats. Similar research as for *Asaphodes stinaria* above.

3.2 ARACHNIDA

Order Aranea (spiders)

Family Gradunglidae

Spelungula cavernicola Nelson/Marlborough conservancy (Nelson cave spider -unofficial common name, rare). Only one species is known but at least 3 widely separated populations occur in caves in the Oparara Valley (including Honeycomb Hill Cave), caves in the lower Heaphy-Gunner valleys and two small caves at Motupipi (Golden Bay). The latter population may be threatened and very small since a cave appears to be able to accommodate only one or two females each (I. Miller pers. comm.) The spider is exceptionally large spanning 12cm when extended. Little ecological information is available. Conservation status unknown.

Research: (rank =1+) Design a survey technique so that their status can be determined.

3.3 STUDIES INVOLVING MORE ONE SPECIES

Note : (1) More topics have been identified in Ramsay *et al.* (1988). The following represent only urgent research requirements.

Pheidole megacephala: (rank = 1) This species is a predatory ant (Hymenoptera : Formicidae) which has been responsible for drastic reductions in invertebrate fauna on islands where it has been introduced (Zimmerman 1948). It is now established in New Zealand and it could pose a serious threat to native land snails and arthropods. The potential effect of the ant on New Zealand terrestrial invertebrates should be determined in order to establish whether or not any control measures are warranted.

Taxonomy of the *Deinacrida* genus: (rank = 1) At present at least two species of *Deinacrida* wetas have not been taxonomically described. There are probably more but these have yet to be brought to my attention. The two outstanding are the "Mahoenui" giant weta and an alpine living (by virtue of it only having been found over 1300m ASL) *Deiriacrida* occurring in the Seaward Kaikoura Ranges (pers. obs.). Both are not synonymous with any other extant species (G. W. Ramsay and M. J. Meads pers. comm.). A third weta from Middle Island (see above) may belong to another genus since it is outwardly so different from the other *Deinacrida* species. This species also needs identification. Its identification may place it in *Hemideina* (ground wetas) which may justify some taxonomic work on this group at the same time.

In order to justify expense for both management and research, it is necessary to know the taxonomic identity of species. A chromosome and gel-electrophoretic study in tandem will give relatively quick results which, while perhaps not finally definitive, will certainly be sufficient to act as a guide to managers as to which species is unique.

3.4 A short list of the most important research topics.

Othoptera: Stenopelmatidae (elsewhere known as Anostostomatidae)

Deinacrida sp. (Mahoenui weta, endangered). Research rank = 1.

Deinacrida tibiospina (Nelson alpine weta, possibly rare). Research rank = 1.

Deinacrida (presumed) sp (Middle Mercury Island giant ground weta - unofficial common name). Research rank = 1+.

Hemideina ricta (Banks peninsula weta, rare). Research rank = 1

Coleoptera : Lucanidae

Dorcus auriculatus (Coromandel stag beetle, vulnerable). Research rank = 1.

Dorcus ithaginus (Mokohinau stag beetle, vulnerable). Research rank = 1+.

Dorcus helmsii (Big South Cape stag beetle -unofficial common name, possibly extinct). Research rank = 1.

Scarabaeidae

Prodontria bicolorata (Given) (Alexandra chafer). Research rank 1+.

Elateridae (click beetles)

Amychus candezei (Chatham Island amychus, rare/vulnerable). Research rank = 1+.

Cerambycidae (longhorn beetles)

Xylotoles candezei (Chatham Island longhorn beetle, possibly extinct). Research rank = 1+.

Curculionidae (weevils)

Hadramphus spinipennis (Coxella weevil, endangered). Research rank = 1+.

Hydrampbus tuberculatus (Banks Peninsula weevil, possibly extinct). Research rank = 1+.

Heterexis seticosus (Campbell Island ribbed weevil, rare/vulnerable). Research rank = 1.

Megacolobus sculpturatus (Akaroa weevil, possibly extinct). Research rank = 1.

Nothaldonus peacei (Whangarei cryptoryhchine weevil, rare/vulnerable). Research rank=1.

Lyperobius buttoni (Wellington speargrass weevil, endangered in the North Island).

Research rank= 1.

Lepidoptera: Geometridae

Xanthorhoe bulbulata (Guenee) (no common name, possibly extinct). Research = rank 1+.

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