No. 74
JULY, 1983

The Tasmanian Naturalist

Registered by Australia Post – Publication No. TBH0495
Postal Address: G.P.O. Box 68A, Hobart, 7001
Editor: D.A. Ratkowsky Annual Subscription: $5.00

Each author is responsible for the opinions and facts expressed in his or her article.
Editor.

CHANGE OF EDITORSHIP

With this issue, there is a change in editorship. I would like to pay my respects and appreciation to my predecessor, Len Wall, who helped bring this journal to its present editorial standard. His efforts, combined with a better printing process than had been available in the past, has given us a journal of which we can be proud. I hope that I will be able to carry on in the same tradition.

Those people who have contributed articles before are urged to continue to do so. In addition, I would like to make a special plea to those readers who have not submitted articles before, to consider doing so in the future. Readers should not be deterred by feelings that what they might be submitting could be considered trivial or insufficiently 'scientific'. Amateur naturalists should note with pride the great contribution that they have made to current knowledge about plant and animal distributions. For example, bird watchers have made enormous contributions to ornithology, but the contributions are by no means confined to that discipline.

Hence, I look forward to receiving articles from a wide range of people. You may rest assured that they will be treated with sympathy by your new editor.

A FAR-FLYING CHRISTMAS BEETLE; THE FIRST RECORD FROM TASMANIA OF *Anoplognathus velutinus* *(Coleoptera: Scarabaeidae)*

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On the 21st November, 1981, Mr. J.R. Penprase collected a Christmas beetle at Hobart Airport, Llanherne, Tasmania. The insect was on the tarmac, about 20-30 metres from an aeroplane which had arrived from Melbourne some fifteen minutes earlier.

Mr Penprase realized that this insect was different to the familiar Christmas beetle, *Anoplognathus suturalis* Boisduval, which is seen in Tasmania during December and January. Specimens of *A. suturalis* are about 20mm long, with the dorsal surface shining and greenish-brown in colour. In contrast, the airport beetle is 26mm long, light brown with no greenish sheen, and its dorsal surface is strewn with white scales. There is a black spot on each wing cover. This insect was presented to the Tasmanian Museum where it was identified, tentatively, as *Anoplognathus velutinus* Boisduval. The known distribution of this species was southern Queensland, New South Wales and Victoria (Carne, 1957, p.134).

A note about the finding of *A. velutinus* at Llanherne was included in the Tasmanian Museum and Art Gallery Annual Report, 1981-82 (p.16). This interested Dr. P.B. Carne, of C.S.I.R.O., Canberra, who subsequently borrowed the specimen and confirmed its identity as *A. velutinus*. Dr. Carne advised that this is the first record of the species from Tasmania and that mid-November is the peak of its flight season.

Nobody can be sure how the beetle reached Tasmania from mainland Australia. However, because of the place where it was found, it is tempting to suspect that it travelled as a stowaway in an aeroplane.

Thanks are due to Dr. Carne for his identification and information and to Mr. Penprase for his gift of the specimen to the Tasmanian Museum.

References

Carne. P.B. (1957). A revision of the ruteline genus *Anoplognathus* Leach (Coleoptera: Scarabaeidae). **Aust. J. Zool.** 5:88-143.

(1982). Tasmanian Museum & Art Gallery Annual Report, 1981-82. 40pp. Hobart.

PRASOPHYLLUM FIRTHII SECOND LOCALITY FOR A TASMANIAN ENDEMIC ORCHID

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On 25th April, 1983 two clumps of about three and five plants respectively of a small greenish Prasophyllum were found at the edge of a low lying swampy area in light Eucalyptus forest near the eastern approach road to Lefroy in northern Tasmania. Two specimens were taken and were shown at the Launceston Field Naturalists Club meeting of 3rd May without identification.

One specimen was sent to the Tasmanian Herbarium where it was identified by Dr. W.M. Curtis and Dr. A.E. Orchard as *Prasophyllum firthii*. The second specimen is preserved in alcohol at the Queen Victoria Museum. The flowers were contracted and although kept in water for a fortnight hardly opened. On a subsequent visit in late May four plants were still found, one of which had ripening ovaries.

Ironically on 29th April, being unaware of what I had found I drove to Friendly Beaches, near Coles Bay looking for *P. firthii* in the locality where it was originally collected, and which was its only known habitat, but the area yielded no Prasophyllum spp. at all.

CHANGES IN THE AVIFAUNA OF MT. WELLINGTON OVER A PERIOD OF SEVEN YEARS

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I have previously published surveys of the avifauna of Mt. Wellington during the breeding season of 1975/76 (Ratkowsky and Ratkowsky, 1977) and during the non-breeding months of 1977 (Ratkowsky and Ratkowsky, 1978), the latter report also containing information on the transition period between the breeding season and the winter months. Recently, during the period 18th September, 1982 - 1st June, 1983, I conducted an expensive survey of the bush birds of Mt. Wellington, making 210 visits (i.e., 81.7% of the days) to the mountain and its foothills. This high intensity of observation has produced an extensive data base. One report (Ratkowsky, 1983), covering the period 18th September, 1982 - 15th April, 1983, records the number of days on which each of 55 species of avifauna was observed, and describes changes in frequency of sightings over the seven months. The purpose of the present report is to compare the results of the recent survey with those of 1975/76 and 1977. As the previous surveys were conducted nine to ten years after the disastrous bushfire of 7th February, 1967, which destroyed virtually all the vegetation of Mt. Wellington, it is of interest to see what changes in avifauna may have accompanied the further vegetation regrowth in the subsequent six to seven years.

Survey Zones and Methods:

Although the survey area was divided into the same twelve zones as used previously (Ratkowsky and Ratkowsky, 1977), the cleared lands zone was not used, and several zones were combined. A brief description of the new zones is given in Table 1.

TABLE 1. Vegetation zones on Mt. Wellington

Zone	Description	Approximate elevation
1	Treeless upper regions	1220-1270 m
2 & 3	Woodlands containing pure stands of *Eucalyptus coccifera*, plus marshlands and grasslands at the same elevation	1100-1220 m
4 & 5	Woodlands with dominant eucalypt *E. urnigera*, plus marshlands and grasslands at the same elevation	800-1100 m
6	Wet sclerophyll forest, dominant eucalypt *E. delegatensis*	600-800 m
7	Wet sclerophyll forest, dominant eucalypt *E. obliqua*	240-670 m
9	The Springs, dominant eucalypt *E. johnstonii*	ca. 700 m
10	Gully communities	240-600 m
11 & 12	Dry sclerophyll open forest	240-500 m

During each survey day, several zones were visited between the hours 07:00 - 11:30 am, and observations, usually aural, were made while walking. A species was recorded once only in each zone for each day irrespective of the number of individuals seen or heard. There was a problem because the zones did not receive the same number of visits (e.g., the high altitude woodlands zones were visited more than three times as frequently as the gully communities). Hence, results were converted to percentages of the total number of visits to each zone in which each species was recorded, for the purposes of the presentation in Table 2.

TABLE 2. Species whose distributions have undergone a significant change between the previous and the recent survey

Species / Zone	1	2&3	4&5	6	7	9	10	11&12
Yellow-tailed Black Cockatoo						+	+	+
Green Rosella		+	+	+			+	
Pallid Cuckoo					–			
Horsfield's Bronze-cuckoo					–			–
Laughing Kookaburra					+			+
Tree Martin				–				–
Black-faced Cuckoo-shrike					–			
White's Thrush					+		+	
Pink Robin					+			
Flame Robin	+			–		–		
Scarlet Robin								+
Dusky Robin				–	–	–		
Olive Whistler		+	+			+		
Grey Shrike-thrush		+						
Grey Fantail						–		
Satin Flycatcher					–			
Spotted Quail-thrush								+
Superb Fairy-wren		–	–	–	–	–	–	
White-browed Scrubwren	+	+				–		
Calamanthus		–	–			–		
Brown Thornbill					–	–	–	
Yellow Wattlebird				+	+	+		
Yellow-throated Honeyeater							+	
Strong-billed Honeyeater			+					
Black-headed Honeyeater			+		–			
Crescent Honeyeater	+							
New Holland Honeyeater					–			
Eastern Spinebill					+			
Striated Pardalote		+					+	
Silvereye		+	+				+	+
European Goldfinch					–			
Beautiful Firetail					–		–	
Dusky Woodswallow					–			
Black Currawong	+							+
Grey Currawong				+		+		
Forest Raven				+			+	

Results and Discussion:

Table 2 lists the 36 bird species of the 55 species recorded which show significant changes in their occurrence in at least one zone between the present survey (up to 31 January, 1983) and the earlier breeding survey (Ratkowsky and Ratkowsky, 1977). A plus (+) sign signifies an increase, a minus sign (−) signifies a decrease, and no entry signifies no change. The common names used are those of the RAOU, 1978, which have also been adopted in publications of the Bird Observers Association of Tasmania. Nineteen of the species in Table 2 show an increase in at least one zone, a further 14 show a decrease in at least one zone, and three species have increased in at least one zone but decreased in at least one other zone. The changes are spread out over all zones.

Species which have increased in the upper zones are the Green Rosella, Flame Robin, Olive Whistler, Grey Shrike-thrush, White-browed Scrubwren, Strong-billed Honeyeater, Black-headed Honeyeater and Crescent Honeyeater, whereas the Striated Pardalote, Silvereye and Black Currawong have increased in some lower elevation zones as well as some higher elevation zone or zones. Several other species have increased in the lower zones. One of these, the Laughing Kookaburra, was totally absent in the earlier survey. Another species, White's Thrush, increased in one of the wet sclerophyll zones (Zone 7) and in the gully communities (Zone 10), and the Pink Robin, which was (and still is) frequent in Zone 10, has spread out to become frequent in Zone 7 as well. The Grey Currawong, which previously had only been observed at low altitudes, is now frequently seen at middle elevations. The Forest Raven, which has always been ubiquitous, increased its frequency in Zone 6, and perhaps surprisingly, in the gully communities, where it had been rare before. The Yellow Wattlebird, which had been absent in the earlier survey,was now present occasionally in wet sclerophyll. Two other species, the Spotted Quail-thrush and Yellow-throated Honeyeater, each increased in one zone.

Species showing a distinct decline in numbers since the earlier survey include the Horsfield's Bronze-cuckoo, Tree Martin, Calamanthus, New Holland Honeyeater and Beautiful Firetail. Several other species showing a decline in at least one zone, viz. the Pallid Cuckoo, Black-faced Cuckoo-shrike, Dusky Robin, Satin Flycatcher, Superb Fairy-wren, European Goldfinch and Dusky Woodswallow, nevertheless remained relatively common in dry sclerophyll (Zones 11 and 12). Some other species which declined in at least one zone, increased in at least one other zone. For example, the Grey Fantail was generally common in wet and dry sclerophyll at lower altitudes, and the Flame Robin, White-browed Scrubwren, Brown Thornbill and Black-headed Honeyeater, were widespread throughout a wide range of altitudes.

Looking at individual zones in Table 2, it can be seen that four species have increased in Zone 1 (with none decreasing), six species have increased in Zones 2 and 3 (with two decreasing), and five species have increased in Zones 4 and 5 (with the same two species decreasing). Similarly, Zone 10, as well as Zones 11 and 12, show more increases than decreases. One can only speculate as to why there is an overall tendency towards an increasing range of habitat for Mt. Wellington's avifauna. Although there has been little change in the vegetation with respect to the plant species that are present, there has been a large increase in the total biomass, as vegetation on Mt. Wellington has slowly recovered from the disastrous bushfire of 7th February, 1967 (Ratkowsky and Ratkowsky, 1982). This may have led to increased availability of food for birds, or to better protection of nesting sites for at least some of the species showing a change in distribution between the present survey, conducted ca. 16 years after the fire, compared to the earlier breeding survey, conducted only ca. 9 years after the fire.

I would now like to consider the transition period between the breeding season and the non-breeding season, and discuss observations obtained from 1st February, 1983 - 1st June, 1983. Two species showed a marked increase in numbers and in range, the Eastern Spinebill and the European Goldfinch, which became widespread at all elevations. The European Goldfinch was even seen on the summit plateau. The increases

in these two species agree with observations made previously (Ratkowsky and Ratkowsky, 1978). Of special interest, however, is the Yellow Wattlebird, which was never observed in the earlier summer survey, and only sparingly in winter. Although I often heard them in 1975 (and in other years) in Lambert Park, where they are known to breed (Sharland, 1958), they kept to lower elevations and did not fly up to exceed the lower elevation boundary of 240 m in the earlier breeding season survey. In the present survey, they ventured above that elevation in summer (e.g., one was observed at The Springs, 710 m, in September, 1982) and at higher elevations during the transition period.

The Olive Whistler, which was widespread during the breeding season, tended to disappear from the survey zone in April, and the Golden Whistler, which occupies slightly lower elevations during the breeding season, moved upwards to frequent the zones previously occupied by the Olive Whistler. The Silvereye also moved upwards in April to occupy all upper zones. Other species that tended to increase their range upwards in the transition period were the Spotted Pardalote, the Strong-billed Honeyeater and the Black-headed Honeyeater. In contrast, the Flame Robin, which had occupied all elevations in the breeding season, decreased its range and numbers, and was neither seen nor heard after April 27.

The Brush Bronzewing was observed on 12 occasions between the beginning of March and mid-April. This was more frequent than in the previous survey. Both species of Bronzewing occur on Mt. Wellington, but I have seen the Common Bronzewing only rarely. One species whose distribution during the various months requires comment is the Pink Robin. In the summer survey of 1975/76, this species was frequent in gullies (Zone 10), but rare in one of the wet sclerophyll zones (Zone 7). However, in the winter of 1977, it became frequent in Zone 7 as well as in Zone 10. In the present survey, as already reported above, in contrast to the former survey, the Pink Robin was frequent both in Zones 7 and 10 during the breeding season. During the transition period, it continued to be observed in Zone 7, but only occasionally in Zone 10. After 20th April, 1983, I observed it only once.

References:

Ratkowsky, A.V. (1983). Birds of the Mt. Wellington Bush. Tasmanian Bird Report No. 12, 1982, Bird Observers Association of Tasmania, in press.

Ratkowsky, A.V. and Ratkowsky, D.A. (1977). The Birds of the Mt. Wellington Range, Tasmania. Emu 77:19-22.

Ratkowsky, A.V. and Ratkowsky, D.A. (1978). A Survey of the Birds of the Mt. Wellington Range, Tasmania, During the Non-breeding Months. Emu 78:223-226.

Ratkowsky, A. and Ratkowsky, D. (1982). Some noticeable changes in the vegetation of Mt. Wellington since the 1967 bushfire. Tasmanian Naturalist No. 70:2-5.

Sharland, M. (1958). "Tasmanian Birds", Angus & Robertson, 3rd. Edition, p.144.

INSECT PARASITIC NEMATODES IN TASMANIAN SOILS

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Many naturalists familiar with a wide variety of plants and animals that can be seen with the naked eye may be unaware of the teeming millions of nematodes that exist all around us. Nematodes, commonly known as roundworms or eelworms but definitely not to be confused with earthworms or ringworm, are relatively simple organisms that comprise a whole phylum of the animal kingdom with some 15,000 described species and an estimated half a million undescribed species. Readers are probably familiar with the relatively very large roundworm parasites of domestic animals and even such parasites of themselves, but most species are less than 1 mm long and live in soil, fresh water and the sea (the longest, *Placentonema gigantissima* from the placenta of sperm whales

reaches over 8 metres in length while the smallest, a marine nematode *Greeffiella minutum* is only 0.08 mm long). A good pasture soil may contain some 60 million nematodes in each square foot of soil and anywhere that is permanently or semipermanently moist can provide a habitat for nematodes (even vinegar vats, and German beer mats have their own special species of nematodes). While the vast majority are harmless to man, one species of nematode causes the grotesque disease "elephantiasis" and another, "river blindness", affects 20 million inhabitants of Africa and there are many plant parasitic species that severely damage a range of important crop plants. One writer summed up the omnipresence of nematodes by stating "that if all the rest of the world was removed, the ghostly shape of everything would remain – in nematodes".

The Rhabditida is an order consisting of many families of nematodes almost all of which feed on decaying plant and animal matter and the bacteria thereon. However two families within this order have become rather more specialised in that instead of just accumulating on dead organic matter and feeding on the wide variety of bacteria found there, they first do their own killing and supply their own special symbiotic bacteria to do this and to provide them with their nutritive requirements. *Steinernema* species *(=Neoaplectana)* and *Heterorhabditis* species have infective stages which can last in the soil sometimes for several years without feeding but when an insect is present they are attracted to it, crawl into its natural body openings (mouth, anus or spiracles) or burrow through interskeletal membranes and finally end up in the insect's blood. Here the infective nematode releases its symbiotic bacterium *(Xenorhabdus sp.)* and this rapidly kills the insect, converts it into suitable food for the nematode and also produces an antibiotic which preserves the insect cadaver from decay. The nematodes reproduce in the cadaver so that even where only one male and one female nematode entered the insect, sometimes several hundred thousand infective juveniles may be produced within a week or so and these can then migrate and infect other insects. The nematodes can kill any species of insect they are able to enter but must have a moisture film through which to swim to their host.

As part of our program of studying such insect pathogenic nematodes, the team here in Tasmania has surveyed most States of Australia and found that soils here more commonly contained steinernematids and heterorhabditids than those in any other State. We (Bedding & Akhurst 1975) developed a simple technique of placing easily reared wax moth larvae at the bottom of a jar of soil sample and even where only one or two pathogenic nematodes were present, these entered this most susceptible of insects, 54 out of 280 samples (19.3%) from a variety of habitats throughout Tasmania had nematodes whereas only 8% (450 samples) from Queensland and only 3% (200 samples) from New South Wales had nematodes. Workers in Holland and Czechoslavakia using our technique found similar levels to those in Tasmania and my colleague Ray Akhurst, who did much of the survey work in Australia, found similar levels to those of Australia in a recent survey of North Carolina in the U.S.A.

In Tasmania, nearly all nematode infected samples were of *Steinernema bibionis* but six were of *Heterorhabditis heliothidis*, six were of a soon to be described new *Steinernema* species and three were of *Steinernema feltiae*. Both *S. bibionis* and *S. feltiae* were almost certainly introduced into Tasmania by white man in soil around the roots of plants or in ships ballast, and indeed it has not been possible to find insect pathogenic nematodes in areas of Tasmania unfrequented by man.

Two species of nematodes from Tasmania have been reared up in large numbers (Bedding 1981) and used in insect control projects (Bedding & Miller 1981a, Bedding & Miller 1981b and Miller & Bedding 1982) and samples have been sent all over the world for other workers to use. Both species will shortly be reared comercially by Biotechnology/Australia Pty. Ltd. who have recently taken up our patent on rearing techniques.

References:

Bedding, R.A., and Akhurst, R.J. (1975). A simple technique for the detection of insect parasitic rhabditid nematodes in soil. *Nematologica* 21, 109-10.

Bedding, R.A. (1981). Low cost *in vitro* mass production of *Neoaplectana* and *Heterorhabditis* species (Nematoda) for field control of insect pests. *Menatologica* 27, 109-114.

Bedding, R.A. and Miller, L.A. (1981). Use of a nematode, *Heterorhabditis heliothidis*, to control black vine weevil, Oitorhynchus sulcatus, in potted plants. *Ann. appl. Biol.* 99, 211-216.

Bedding, R.A. and Miller, L.A. (1981). Disinfesting Blackcurrant cuttings of *Synanthedon tipuliformis*, using the insect parasitic nematode, *Neoaplectana bibionis*. *Environ, Entomol.* 10, 449-453.

Miller, L.A. and Bedding, R.A. (1982). Field testing of the insect parasitic nematode, *Neoaplectana bibionis* (Nematoda: Steinernematidae) against currant borer moth, *Synanthedon tipuliformis* (Lep.: Sesiidae) in blackcurrants. *Entomophaga* 27, 109-114.

Printed by Advance Publicity Co., North Lindisfarne