***Radumeris tasmaniensis*** **System:** Terrestrial

| Kingdom | Phylum | Class | Order | Family |
|---|---|---|---|---|
| Animalia | Arthropoda | Insecta | Hymenoptera | Scoliidae |

**Common name** scoliid wasp (English), yellow flower wasp (English), guerin (English, India), burmeister (English, Mexico)

**Synonym** *Campsomeris tasmaniensis* , (Saussure)

**Similar species** *Campsomeris limosa, Campsomeris plumipes fossulana, Scolia affinlis, Scolia atrata, Scolia dubia, Scolia flavifrons, Scolia manilae*

**Summary** The yellow-flower wasp, *Radumeris tasmaniensis*, is native to Australia and Papua New Guinea. It is a solitary ectoparasite of beetles in the Scarabaeidae family; laying its eggs on the paralysed larvae. Since 1999 the species has been confirmed as present at scattered sites north of the Manukau Harbour, New Zealand sites and is precipitating concerns about the conservation of native beetles.

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**Species Description**
Members of the family Scoliidae are solitary ectoparasites of scarabaeid larvae (and occasionally Curculionidae larvae). They usually have curled or strongly curved antennae and both sexes are winged. Scoliidae can display a characteristic flying pattern; they fly on a horizontal plane less than 1 meter above the ground in a regular circular “figure 8” course. Other higher more direct flights are seen. Eggs of the Scoliidae family range in length from 2 to 4mm. They are about a quarter less wide than they are long, with both poles rounded and a slightly wider anterior end. The ventral side is almost straight and the dorsum is slightly convex.\r\n
Females yellow-flower wasps (*Radumeris tasmaniensis*) are about 30 mm long with a 40 mm wingspan and have a large robust body with a broad abdomen. Size range of males in New Zealand is 11.5 - 20.5 mm long. Males have a more slender body with a narrow abdomen. Females have a dark brown thorax, a narrow waist and a broad orange abdomen with narrow black stripes. Their underside has wide black stripes with narrow white stripes. Males have alternating black and yellow stripes on both the upper and lower surfaces. The female has short antennae about the same length as the width of the head; the male has longer antennae, about half the length of the forewings. Both male and female have orange to brownish wings, with very fine veins towards the wing tips.

**Lifecycle Stages**
Most Scoliidae have a single annual reproduction period. In New Zealand the yellow-flower wasp appears to have 2 reproductive periods in the far north of its range (T. Beauchamp, pers. comm.). In New Zealand development times have taken 68 and 76 days at 25C in summer and 126 days in winter (Willoughby & Wilson 2006). This is consistent with other Scoliidae where under optimal conditions, the incubation period of eggs is 2-3 days , the larval period is 6 - 9 days, and the cocoon and pupal stage 30 - 40 days in summer. Most species hibernate within the cocoon (in the mature larvae stage) with the onset of winter, and this may be likely in the cooler parts of the range in New Zealand.

**Uses**
*Radumeris tasmaniensis* has limited effects on Scarabaeidae in Australian sugar cane fields (Allsopp 1992). Other wasps in the Scoliidae family have been used for the biological control of scarabaeid beetles (e.g. *S. manila* was introduced from the Philippines into Hawai'i to control *Anomala orientalis*). Research into naturally produced compounds in parasitic wasps could reveal chemicals with useful properties, such as anti-microbial activity (Dani *et al*. 2003). This is because insects that are parasitized by wasps have impaired immune systems (and a greater susceptibility to opportunistic pathogens), which compromises the survival of the wasp progeny. The production of antimicrobial factors by parasitic wasps could protect the host larva from microbial infection allowing it to live longer and provide the wasp larvae with food for a longer period of time. This production of antimicrobial compounds in wasp venom is an interesting target of current research (Dani *et al*. 2003).

**Habitat Description**
*Radumeris tasmaniensis* is an ectoparasitic (it lives on the outside of its host) and solitary in nature. The female tunnels into sand and locates a scarab beetle larva, which they sting and paralyse before laying an egg nearby. The larva then becomes a source of food for the young wasp as it grows. In its introduced range in Northland and the Coromandel Peninsula, New Zealand, *R. tasmaniensis* is reported in scattered coastal spots.

**Reproduction**
Male yellow-flower wasps that have emerged from the sand mate with females that emerge from the soil. Females locate larvae using antennal tapping on the sand surface. It is not known if detection is chemical or physical, but wasps appear to know if another female is present in that host larvae (Hardwick & Wilson 2006). Laboratory based studies indicate that larvae >2g are chosen in New Zealand (Willoughby and Wilson 2006). Host larvae are found underground at a up to 0.4 m deep. Wasps have also been found under larvae on the surface (Rawnsley 2006). \r\n\r\n
The female stings the host larva several times in the thoracic region to paralyse it and Scollidae females buries it to a depth of between 25cm and 1m. Female Scoliidae can produce a maximum of 2 eggs per day in optimum conditions. For example *Campsomeris tasmaniensis* Sauss laid 95 eggs in 70 days (Illingworth 1921). *C. tasmaniensis* and *C. radula* females have been noted to produce mostly male progeny with an occasional female among them (Illingworth 1921).

**Nutrition**
Larvae of Scoliidae hatch out of eggs laid on paralysed host grubs. Wasp larvae then devour the host larvae, which are rich in protein. Adult yellow-flower wasps of other Scoliidae obtain carbohydrate-rich meals derived from flower nectarines. Males yellow flower wasps have been seen visiting Australian coastal manuka (*Leptospermum laevigatum*), five finger (*Pseudopanax surville*) and Canadian fleabane (*Conyza canadensis*) Female wasps visited these plants and also gums (*Eucalyptus* spp), manuka (*Leptospermum scoparium*), toetoe (*Cortaderia splendens*), pohutukawa (*Metrosideros excels*) and cottonwood (*Cassina leptophylla*) (Rawnsley 2006).

**General Impacts**
Yellow-flower wasps parasitize scarabaeid beetles and thus have the potential to cause declines in beetle populations in this family. The yellow flower wasp is a parasitoid of large (>2 g) scarab larvae (Willoughby & Wilson 2006). Evidence and research in this area is deficient but there is no evidence of yellow-flower wasps using hosts with smaller larvae in New Zealand. In New Zealand there is a concern that over time that the wasp may evolve to use smaller host larvae and then be capable of using other hosts.\r\n\r\n
There is no evidence that this wasp stings people. Many have been handled during the course of research (V. Rawnsley, pers. comm.).

**Management Info**
Preventative measures: Research has not found ways of early detection, or attracting wasps to traps. The movement mechanisms that the wasp uses are poorly understood. Further potential attractants have been identified for trails should this be necessary (Harderick & Wilson 2006). \r\n
Biological: No biological control agents have been used in New Zealand. The hyperparasitoid bee fly larvae *Ligyra satyrus* are found inside pupae of yellow-flower wasp in Queensland (Yeates *et al*. 1999).

**Principal source:**

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## ALIEN RANGE

**[1]** NEW ZEALAND

## BIBLIOGRAPHY

**14** references found for **Radumeris tasmaniensis**

**Managment information**
Harris, R J. and P.E.C. Read., 1999. Enhanced biological control of wasps. SCIENCE FOR CONSERVATION 115
**Summary:** Available from: http://www.doc.govt.nz/upload/documents/science-and-technical/Sfc115.pdf [Accessed 18 February 2008]

**General information**
Barratt, B.I.P. 2003: Aspects of reproductive biology and behaviour of scoliid wasps. DOC Science Internal Series 147. Department of Conservation, Wellington.
**Summary:** The yellow flower wasp, *Radumeris tasmaniensis* Saussure (Scoliidae), has recently established in northern Northland, New Zealand. To assist in determining the potential for eradication, a literature review of some aspects of scoliid reproductive biology and behaviour was carried out.
Available from: http://www.doc.govt.nz/upload/documents/science-and-technical/dsis147.pdf [Accessed 12 February 2008]
Barratt, B.I.P. 2003. Reproductive biology and behaviour of Scoliidae. Department of Conservation Science Advice Report. AgResearch, Mosgiel. 28 February 2003. 9pp.
Barratt, B.I.P., Willoughby, B.E., Wilson, D. and Booth, A.M., 2002, The Yellow Flower Wasp, *Radumeris tasmaniensis* Saussure (Hymenoptera: Scoliidae): Potential threat to New Zealand native fauna, New Zealand Plant Protection 55:25-29 (2002)
**Summary:** A survey was carried out during February and March 2001 to determine the distribution and potential host range of *R. tasmaniensis* in Northland. This confirmed that *R. tasmaniensis* was present at the three sites from which it was first reported in 2000, but appeared not to have established more widely. A small extension to its known range was discovered in a further survey in March-April 2002. The rationale and methodology of the survey is presented, and the conservation implications of the establishment of this species in New Zealand are discussed.
Available from: http://www.nzpps.org/journal/55/nzpp55_025.pdf [Accessed 18 February 2008]
Dani, M.P., Richards, E.H., Isaac, R.E. and Edwards, J.P. 2003. Antibacterial and proteolytic activity in venom from the endoparasitic wasp *Pimpla hypochondriaca* (Hymenoptera: Ichneumonidae), *Journal of Insect Physiology 49*: 945 – 954.
**Summary:** A newspaper article about local environmental issues.
Krombein, K.V. 1963: The Scoliidae of New Guinea, Bismark Archipelago and Solomon Islands. Nova Guinea, Zoology 22: 543-651
Landcare Research. 2007c. Home > Research > Biodoversity and Conservation > Invasive invertebrates > Wasps > Impact in New Zealand.
**Summary:** Available from: http://www.landcareresearch.co.nz/research/biocons/invertebrates/Wasps/impacts_intro.asp [Accessed 10 April 2007]
Logan, D.P. 1999: Insect parasites of scarabs from sugarcane fields in southern Queensland (Coleoptera: Scarabaeidae). Aust J. Entomol. 38: 382-384
MAF (Ministry of Agriculture and Forestry)/Biosecurity New Zealand Exotic pest info sheet (undated) Yellow Flower (or Scoliid) Wasp (*Radumeris tasmaniensis*)
**Summary:** An information sheet alerting the public to the introduction of the wasp into New Zealand. It provides information for identification and requests the public to report sightings outside the wasp s present known range.
Available from: http://www.ew.govt.nz/enviroinfo/pests/animals/documents/scoliidwasp.pdf [Accessed 18 February 2008]

Molloy, J.; Bell, B.; Clout, M.; de Lange, P.; Gibbs, G.; Given, D.; Norton, D.; Smith, N.; Stephens, T. 2002: Classifying species according to threat of extinction. A system for New Zealand. Threatened species occasional publication
**Summary:** Since 1992 the Department of Conservation has been using a system (generally known as the Molloy-Davis system) which ranks species according to their priority for recovery action. With the subsequent recognition of the importance of integrated prioritising, and focusing on places, it became clear that they should separate the process of classifying the threats to species from prioritising species recovery actions. They also recognised the need for a threat classification system that could be used for all New Zealand's species groups, including marine species. A process to develop a new threat classification system was therefore initiated in 1999. This document, by Janice Molloy and others, contains the result of that process.
Rawnsley, V., 2006. Observations of yellow flower wasp activity at Butlers Creek, Ninety Mile Beach. DOC RESEARCH & DEVELOPMENT SERIES 242
**Summary:** Available from: http://www.doc.govt.nz/upload/documents/science-and-technical/drds242.pdf [Accessed 18 February 2008]
Willoughby, B.E., Wilson, D. and Barratt, B.I.P. 2002. *Radumeris tasmaniensis* Saussure in New Zealand: distribution in 2002. Report for Department of Conservation, Northland Conservancy. AgResearch NZ Ltd., Hamilton. June 2002. 17pp.
Willoughby, B., Wilson, D. and Barratt, B. 2001. *Radumeris tasmaniensis* Saussure in New Zealand: Distribution and Potential Host Range (Poster Abstract).New Zealand Plant Protection (2001) Volume 54
**Summary:** Brief outline of potential impacts and hosts in New Zealand and description of surveys conducted by the Ministry of Agriculture and Forestry.
Willoughby, B., Wilson, D. and Barratt, B.I.P. 2003. *Radumeris tasmaniensis* Saussure in New Zealand: distribution in 2003. Report for Department of Conservation, Northland Conservancy, June 2003. 27pp.