THREAT DATA

Rose beetle

(*Adoretus versutus*)

Source: http://www.discoverlife.org/20/q?search=Adoretus+versutus

CRC10010

Enhanced Risk Analysis Tools

Rose beetle

(*Adoretus versutus*)

Adoretus versutus is one the major taro pest in the South Pacific which also attacks cocoa, cacao, coffee, rose etc. The insect known by several English names like rose beetle, Indian rose beetle, Japanese rose beetle and Fijian cane root grub. *A. versutus* is a polyphagous insect that attack many ornamental plants. No effective control measure is available to manage this pest.

Distribution: *A. versutus* is native to Indian region (Lever, 1945). The pest reported in Sri Lanka, India, Indonesia, Pakistan, Madagascar, Mauritius, Réunion, St. Helena, Seychelles, Fiji, Samoa, Tonga, Wallis Islands, Cook Islands. Not currently recorded in Australia and New Zealand.

Host range/Alternate host: *A. versutus* is a polyphagous insect that has many major (18 species) and minor (22 species) hosts. **Taro** is one of the major host and 18 taro varieties get affected by this pest (ref. CPC 2008). **Apple**, **pears**, orange, lemon, papaya are among the many minor hosts of *A. versutus.* Besides fruits and cultivated crops the pest also attacks many ornamental plants. *A. versutus* is also a pest of *Eucalyptus tereticornis* and on fresh Papaya Fruit in Fiji.

(A) **Biology of the Pest**: Adult *A. versutus* are nocturnal and feed mainly in the early hours of the night. After feeding, they hide 5-10 cm deep in the ground and disappear completely during daylight hours. If disturbed during feeding, the beetles fall to the ground. The generations are continuous. The fecundity *of A. versutus* females is not known but comparison with related beetles of similar size suggests the possibility that each female may produce about **40 eggs** (Waterhouse and Norris, 1987). Eggs lay in the soil where the **life cycle completes by about 3-months** (Waterhouse and Norris, 1987). The larvae feed on roots and decaying vegetation and sometimes on branches. Dark-brown body of the adult insect (12.8 mm long, 6.8 mm wide) covered with dense greyish-white scales dotted with brown-red hairs surrounding small blackish-brown alveoles on the wing cases. The strongly developed fore- and hind-legs are used for burrowing. Males have a smaller last sternite than females.

Symptom and Damage: Adult *A. versutus* attack leaf of both seedling and mature plant that cause defoliation. Seedlings are very vulnerable to attack because they can be defoliated rapidly and heavy defoliation leads to death of young seedling. Therefore, the insect attack in nursery is very damaging compared to negligible in mature plants.

The adults feed by perforating the leaflets, starting from the middle and without destroying the ribs. The leaflets are eaten away in very small but numerous patches, giving a skeletal appearance to the leaflet. The attacks are more numerous at the apex of the leaflets than at the base. Besides this characteristic feeding behaviour, the adult rose beetles make depressions in the border of the areas eaten, which is typical of *Adoretus spp*. and distinguishes them from the damage caused by other foliage pests. *A. versutus* feed in the early hours of the night

Fig. 1. Leaf damage caused by insect *Adoretus sp.*

Source:http://images.google.com.au/images?ndsp=20&um=1&hl=en&q=Damage+%2BAdoretus&start=0&sa=N

Affected plant parts: Leaves and inflorescence.

Resistant plant variety: No resistant varieties for taro are available yet.

Pest movement and Dispersal: The infested plant materials (especially leaf) carried out by people is the most common pathway to disperse *A. versutus* in new areas. The larvae in infested nursery could also early be dispersed in new areas through soil movement.

Impact: The damage caused by *A. versutus* in taro crop is not available but the reports for other host are available in literature. For example, in Cook Island affected plants are avocados, oranges, papayas, citrus fruits, Barringtonia edulis (90% damaged), Terminalia catappa (80-90%), beans (young: 70%; mature: 30%), lychees (60-80%), Hibiscus tiliaceus (60%), ginger (20%), cashews (15%), bananas (7%), sweet potatoes (5%), white guavas (5%), pomelos (4-5%) and apples (2%) (Beaudoin, 1992). On Vitilevu island damage reached 90% on cocoa seedlings. In Tonga, damage has been observed on ginger (80%), grapevines (50%), beans (30%) vau [Hibiscus tiliaceus] (25-40%) and radishes (20%) (Beaudoin, 1992). In Fiji Vernon (1976) described serious but local damage to cocoa seedlings by A. versutus adults feeding. Lever (1945) quoted accounts of severe attack, sometimes fatal to cocoa seedlings. Fletcher (1916) reported attacks on grapes, figs, pears and plums, and Lever (1946) added aubergines, cowpeas, ginger and Hibiscus tiliaceus. Veitch (1919) recorded attack on guavas, and Veitch and Greenwood (1921) stated that the adults fed sparingly on sugarcane foliage. Putturam et al. (1976) reported attack on sorghum, the beetle feeding on the blossoms and milky grains.

Since there is no effective control measure for this pest, therefore farmers are very concern about this pest and attacks on cocoa and roses appear to cause the greatest concern (Waterhouse and Norris, 1987).

Phytosanitary risk: *A. versutus* is a quarantine pest in South Pacific regions.

(B) **Natural Enemies**: No insect natural enemies are recorded for *A. versutus* (Waterhouse and Norris, 1987).

Management: *A. versutus* management is difficult task because a considerable part of its life cycle occurs underground. The current chemical control with dieldrin spray in the soil surface is inefficient, expensive and cause environmental pollution. Similarly the cultural methods are also costly for the small growers. Maintaining a clean, weed-free plantation and buffer zone is an important step in keeping populations low. Minor damage can be tolerated.

Cultural methods: In case of cocoa cultivation, there is a tradition of building a low wall of stones or sticks around cocoa seedlings to protect them from *A. versutus*, but the cocoa is liable to be attacked as soon as it grows above the barrier (Lever, 1945; Urquhart, 1961). Such methods are labour intensive, expensive and may have the disadvantage of reducing photosynthesis and hence growth. In Malaysia, Samoa and Fiji, in cocoa the damage reduce by putting up structural barriers (such as coconut fronds or bamboo fences) around each plant, provided that those are at least as tall as the foliage. This method is effective in first year after planting, later it becomes impracticable as the plants grow taller (Entwistle, 1972). No practical measures are known to control the underground stages of *A. versutus*, but the larva's habit of emerging at night and traversing the soil surface to attack the host plant could be exploited by hand-picking. Hand-picking of adult beetles by lantern light has also been advocated (Lever, 1945).

(C) **Chemical control:** No effective chemical is available. The practice of spraying the soil surface of young cocoa plantations in Fiji with dieldrin at the time of peak adult emergence in November-December is no longer current. This practice also results in significant environmental pollution (Waterhouse and Norris, 1987; Lefeuve and Decazy, 1990).

(D) **Integrated Pest Management:** An integrated approach using coconut shading and vegetative fencing may be adopted. However, smallholders have not used chemical or agronomic control for rose beetles as the cost of chemicals and labour to erect fences and/or shading has proved too expensive.

(E) **Biological Control:** Biological control attempts against *A. versutus* were reviewed by Waterhouse and Norris (1987). Introductions of insect parasitoids have been made in Fiji, Solomon Islands, Western Samoa, Vanuatu and Mauritius, primarily against other white grub pests and one, Micromeriella marginella modesta, became established on *A. versutus* in Fiji but does not contribute to its control.

Quarantine Risk: High. *A. versutus* has multiple host range and difficult to manage in field conditions because of its eggs and larvae inhabit in soil. *A. versutus* designated as a quarantine pest in South Pacific regions.

Probabilities of Entry: Low -. Both eggs and larvae of *A. versutus* are soil inhabitant and the infected plant parts mainly leaf that are not usually associated with export.

Possibility of Establishment: Moderate – Because of multiple host capacity, the entry of *A. versutus* has good chance to find a suitable host and establish quickly under favourable climatic conditions in many parts of Australia.

Probabilities of Entry and Establishment: Low – In spite of suitable climatic conditions and divers host capacity, *A. versutus* has low chance of entry and establishment in Australia due to its low entry possibility.

Economic Impact: High – Including taro, *A. versutus* also attack and cause a significant damage to many commercial crops. The management of this pest is also very difficult that results high economic impact on the economy.

Environmental Impact: Low – Under current situation where cultural practices are the only way to keep *A. versutus* population low in the field conditions, therefore the environmental pollution from chemical application would be very negligible.

Social Impact: Moderate – Since no effective chemicals are available to control *A. versutus* in field. Therefore, many small growers would suffer by the damage severity of this pest on a number of crops. This will have negative impacts on local community.

Pest management cost: High – In absence of effective chemical controls, the cultural practice is going to be very cost effective to manage *A. versutus* in field. The cost may vary from place to place depends to labor wages, pest severity and other factors and this figure could be vary from $400 to $800/ha.

Yield loss despite control efforts: Based on pest biology, available control measures, and its impact on the host plant the total yield loss assumed to be between 10 – 30% for individual crop under proper control measures.

Export revenue loss due to loss of Pest Freedom Status: Medium – although *A. versutus* possess low risk of dispersion via international trade however, difficulty and ineffective pest management at field level are the main concerns in export market.

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