PLANT PEST NOTICE

No 50

Red palm weevil
Rhynchophorus ferrugineus

Fig. 1 *Rhynchophorus ferrugineus* adults

Background

Rhynchophorus ferrugineus Olivier (Coeloptera: Curculionidae) is the most important pest of the date palm (*Phoenix dactylifera*) in the world. It is native to southern Asia and Melanesia, where it is a serious pest of coconuts (*Cocos nucifera*). Since the 1980s it has rapidly expanded its geographical range westwards. It reached Saudi Arabia and the United Arab Emirates in about 1985, spreading throughout the Middle East and into Egypt. In 1994 it was detected in Spain and in 1999 in Israel, Jordan and the Palestinian Authority Territories. It has since spread to the Balearic Islands (2006), Canary Islands (2005), Cyprus (2006), France (2006), Greece (2006), Italy (2004) and Turkey (2007). The two main palm species of concern in the Mediterranean region are date palm and Canary Island date palm (*P. canariensis*), the main crop and ornamental species, but it also attacks several other ornamental palms that are regularly imported into Britain, such as chusan palm (*Trachycarpus fortunei*). The European Commission in the process of introducing emergency measures to prevent the further spread of *R. ferrugineus* within the community.

Geographical Distribution

Rhynchophorus ferrugineus is present in the following regions and countries: **Europe and Mediterranean**: Egypt, France, Israel, Italy, Greece, Jordan, Palestinian Authority Territories, Spain and Turkey. It may also be more widespread in North Africa. **Asia**: Bangladesh, Bahrain, Cambodia, China, India, Indonesia, Iraq, Iran, Japan, Kuwait, Laos, Malaysia, Myanmar (Burma), Oman, Pakistan, Philippines, Qatar, Saudi Arabia, Sri Lanka, Taiwan, Thailand, United Arab Emirates and Vietnam. **Oceania**: Papua New Guinea, Solomon Islands, Western Samoa.

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Host Plants

Rhynchophorus ferrugineus feeds primarily on palms (Arecaeae) and has been recorded on the following plants: **Agavaceae**: *Agave americana* (century plant). **Arecaceae**: *Areca catechu* (betel nut palm), *Arenga saccharifera* (sugar palm), *A. pinnata* (sugar palm), *Borassus flabellifer (*toddy palm), *Borassus* sp. (palmyra palm), *Calamus merrillii* (rattan), *Caryota cumingii* (fishtail palm)*, C. maxima* (giant mountain fishtail palm), *Cocos nucifera* (coconut), *Corypha utan* (= *C. gebanga*, *C. elata*) (gebang palm), *C. umbraculifer* (talipot palm), *Elaeis guineensis* (oil palm), *Livistona decipiens* (ribbon fan palm)*, L. chinensis* (Chinese fan palm), *L. saribus* (= *Livistona cochinchinensis)* (serdang palm), *L. subglobosa, Metroxylon sagu* (sago palm)*, Oneosperma horrida, O. tigillarium* (nibong palm), *Phoenix canariensis* (Canary Island date palm)*, P. dactylifera* (date palm), *P. sylvestris* (Indian date palm), *Oreodoxa regia* (royal palm), *Sabal umbraculifera* (pygmy date palm)*, Trachycarpus fortunei* (Chusan palm) and *Washingtonia* sp. **Poaceae**: *Saccharum officinarum* (sugar cane).

Pest Biology and Detection

Adults are large, being up to 42 mm and 16 mm wide (Figs. 1 and 4), with a long rostrum, characteristic for the weevils. They are reddish-brown in colour with variable dark markings on the pronotum. All life stages may be spent inside the host palm. Each adult female deposits between 200 to 300 eggs in separate holes or cavities on the host plant. Eggs (Fig. 2) are whitish-yellow, smooth, shiny, cylindrical with rounded ends, slightly narrower at the anterior end, and about 3 mm long and 1 mm wide. These hatch in two to five days, and larvae bore into the interior of the palms, feeding on the soft succulent tissues, discarding all fibrous material. Larvae (Fig. 3) are legless, with a creamy-white body and brown hard head capsule, and grow up to 50 mm in length. The larval period varies from one to three months. Pupation occurs in an elongate oval, cylindrical cocoon made of fibrous strands, about 40 mm in length (Fig. 3). Adult weevils (Fig. 4) emerge 2-3 weeks after pupation. Thus the life cycle is completed in about 4 months. Early symptoms of attack are distinctive but hard to see: egg laying notches; cocoons inserted into the base of the palms; an eccentric growing crown; holes at the base of cut palms; symptoms resembling those caused by lack of water such as wilting, desiccation and necrosis of the foliage (Fig. 5); tunnelling within the stems and trunk (Fig. 6). Larvae and adults destroy the interior of the palm tree, often without the plant showing signs of deterioration unless damage is severe. Hollowing out of the trunk reduces its mechanical resistance, making the plant susceptible to collapse and a danger to the public. In most cases, attack on *Phoenix* and other palms leads to the death of trees whatever their size (Fig. 7). Visual examination allows detection of symptoms but cannot determine if there are larvae and adults present inside the trunk. Pheromone traps, acoustic detection or infrared systems can be used to detect this pest.

Economic Importance and Damage

Rhynchophorus ferrugineus is a major economic pest of coconut palm, date palm, oil palm and sago palm. It also attacks a wide range of ornamental palms. Severely attacked plants exhibit a total loss of foliage and rotting of the trunk, which eventually results in the death of the tree.

Control Measures

The availability of effective insecticide treatments against *R. ferrugineus* in the UK is limited. There are several insecticidal treatments that are effective when applied to the soil before planting, but these may be of little/no use in the UK as the pest is most likely to be introduced on imported (planted) trees. In Europe, contact (organophosphate based) insecticides have been trialled, but these are no longer approved for use in the UK. Also, due to the limited amount of its life cycle spent outside the tree, the window of opportunity for use of contact insecticides against *R. ferrugineus* is very small. Systemic insecticides have also been shown to have some effect in Europe, but modes of application are inappropriate for the UK. For example, imidacloprid tree injections can be used in Europe, but currently there are no formulations approved for use in this way in the UK. Destruction is thus likely to be the only successful eradication measure available in the UK. Research into acoustic methods of detection of *R. ferrugineus* is ongoing, as is research into its control using waveguide (microwave) irradiation. Entomopathogenic nematodes (*Steinernema carpocapsae* and *Heterorhabditis* spp.) may also be effective in controlling *R. ferrugineus*. Both nematode species are readily available from UK biocontrol agent suppliers, and considerable research has gone into the study of these biocontrol agents, but with mixed results. Substantial research has also been carried out into the effectiveness of food baited pheromone traps for the mass trapping of *R. ferrugineus,* achieving good results on a large scale both in the field and in laboratory tests. The addition of dates to pheromone traps has also been shown to be very effective compared to pheromone alone, in field trials in India. Pheromone traps targeting *R. ferrugineus* are used in the field in Asia. Their use may or may not be practical in UK situations, where isolated outbreaks may occur.

Advisory Information

Suspected outbreaks of *Rhynchophorus ferrugineus* or any other *Rhynchophorus* species should be reported to the local Defra Plant Health and Seeds Inspector or to PHSI Headquarters, York (Tel.: 01904 455174, Fax: 01904 455197) and samples submitted to the Central Science Laboratory for identification.

Fig. 2 Red palm weevil eggs © 2005 Ce.Spe.Vi. - Pistoia

Fig. 3 Red palm weevil mature larva © Govern de las Illes Balears

Fig. 3 Red palm weevil cocoon © SEEA

Fig. 4. Red palm weevil adult © AE Agro

Fig. 5. Red palm weevil damage to foliage © 2003 International Palm Society

Fig. 6. Red palm weevil larval tunnel © 2003 International Palm Society

Fig. 7. Palm dying due to attack by red palm weevil © 2005 Ce.Spe.Vi. - Pistoia

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Central Science Laboratory. May 2007