The Red Palm Weevil in the Mediterranean area

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The Red Palm Weevil in the Mediterranean Area

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1. Adult red palm weevil.

The red palm weevil, *Rhynchophorus ferrugineus* Olivier, has become the most important pest of the date palm in the world (Gomez & Ferry 1998).

2 (left). Larva in a date palm trunk. 3 (right). Adult red palm weevil emerging from its cocoon.

Originating in Southern Asia and Melanesia, where it is a serious pest of coconuts, this weevil has been advancing westwards very rapidly since the mid 1980s. It had reached the Eastern region of the Kingdom of Saudi Arabia in 1985 (pers. obs.) and afterwards spread to many other areas in the Kingdom (Abozuhairah et al. 1996). The pest was first recorded in the northern United Arab Emirates in 1985, and since then it has spread to almost the entire U.A.E. (El-Ezaby 1998) and to Oman. In Iran, it was recorded in Savaran region in 1990 (Faghih 1996). Then it was discovered in Egypt at the end of November 1992 in El-Hussinia, Sharquiya region (Cox 1993). In 1994, it had been captured in the south of Spain (Barranco et al. 1996) and in 1999 had been found in Israel, Jordan and the Palestinian Authority Territories (Kehat 1999).

The cause of the high rate of spread of this pest is human intervention, by transporting infested young or adult date palm trees and offshoots from contaminated to uninfected areas.

In this article we present the current situation of the red palm weevil in Spain, Egypt and the Near East, to demonstrate the seriousness of this pest and the high risk of its arrival in other Mediterranean countries. In these countries, the two main palm species concerned are *Phoenix dactylifera and P. canariensis*, the main crop and ornamental species in the Mediterranean area, but it could attack some others ornamental palms (Barranco et al. 2000). Our purpose is to emphasise the need for urgent and strong prophylactic

4. Damage to a leaf base.

measures to avoid new catastrophes and for the reinforcement of co-operative international research against this pest.

The red palm weevil is a member of Coleoptera: Curculionidae. The male and female adults are large reddish brown beetles about 3 cm long and with a characteristic long curved rostrum; with strong wings, they are capable of undertaking long flights.

Damage to palms is produced mainly by the larvae. Adult females lay about 200 eggs at the base of young leaves or in wounds to the leaves and trunks; the grubs feed on the soft fibers and terminal bud tissues. They reach a size of more than 5 cm before pupation. Except just before pupating, they move towards the interior of the palm making tunnels and large cavities. They can be found in any place within the palm, even in the very base of the trunk where the roots emerge.

Pupation occurs generally outside the trunk, at the base of the palms. The larva pupates in a cocoon made of brown dried palm fibres.

Overlapping generations with all life stages can be present within the same palm tree. Generally the adult weevils present in a palm will not move to another one while they can feed on it.

Usually the damage caused by the larvae is visible only long after infection and by the time the first symptoms of the attack appear, they are so serious that they generally result in the death of the tree. This late detection of the presence of the weevil constitutes a serious problem in the fight against the pest and in any attempt to guarantee pest-free status in adult trees. Despite research carried out so far, no safe techniques for early detection of the pest have been devised.

In Spain, very soon after the red palm weevil killed the first *Phoenix canariensis* in some gardens of Almuñecar, the relevant authorities initiated various actions to combat the pest.

Intensive chemical treatments have been used to protect the Phoenix palms and to try to cure affected trees. Despite the difficulty in operating in the public gardens environment, foliage spraying has been conducte with various insecticides: Fenitrotion, Clorpirifos, Diazinon or Metidation. Preventive treatment of all the palms, even healthy ones, has been repeated once a month outside the tourist season.

Insecticides such as carbaril and imidacloprid have been injected several times and in various places all around the stems of palms. Simultaneously, a programme of mass trapping using aggregation pheromone and semi-synthetic kairomone has been initiated (Esteban-Durán et al. 1998). But despite all these efforts, more than one thousand of Phoenix have been killed. In an area that extends from Motril to Nerja, in the Mediterranean coast of Granada and Málaga, the weevil is still present and has spread to villages close to the initial points of infection.

There is every evidence to suggest that the first weevils were introduced into Spain from adult palms imported from Egypt. Before the arrival of the weevil in the south of Spain, Egypt was the westernmost place where the red palm weevil has been recorded. Furthermore, as the importation of palms from Egypt was not prohibited, Egypt has been the main source of supply of ornamental adult Phoenix palms to satisfy the very substantial demand that exists in all the coastal cities of Spain and, more generally, of southern Europe.

In Egypt itself, the introduction of the red palm weevil was caused by an importation of offshoots from the United Arab Emirates. At the beginning, the extension of this pest into Egypt was restricted to a limited number of locations in two north-eastern provinces. In 1995, three years after its first discovery in Egypt, an Egyptian agriculture official considered that the red palm weevil had been eradicated (Ferry 1996). Unfortunately, this announcement was erroneous. In the two provinces where the pest was first recorded, the red palm weevil continues to infect and kill new date palms year after year, despite all the efforts developed to combat it.

Various techniques have been used to try to control the red palm weevil (pheromone traps) and to save infested date palms (chemical control by pouring pesticides into the trunk and injection of entomopathogenic nematodes (Shamseldean 1994)). Despite good results of these techniques in the laboratory, they are not efficient enough in the field to succeed in eliminating red palm weevil. The reason for this is probably the great difficulty in reaching all life stages of the weevil inside an adult palm tree, even with intensive and repeated stem injections or perfusions. Furthermore, such intensive activity is impossible for economic and practical reasons in places with a large number of date palms.

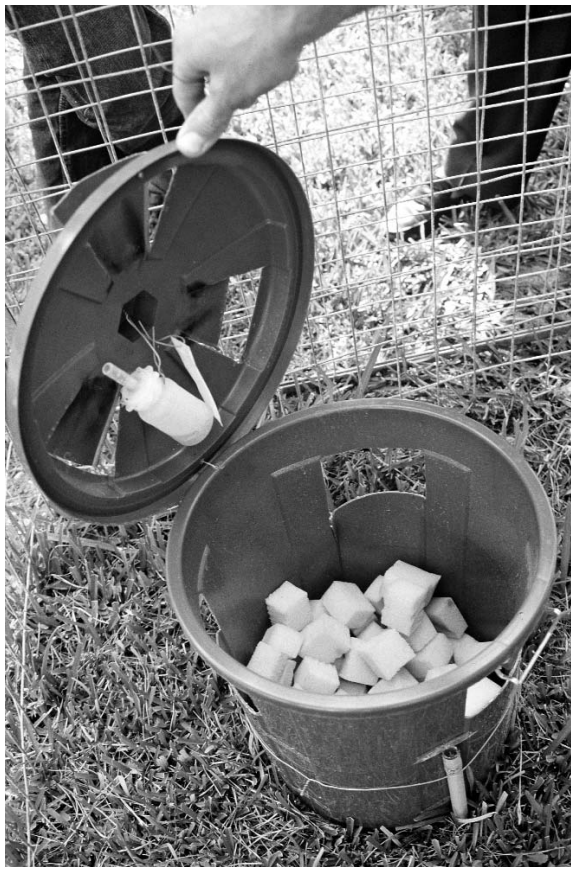
In Egypt, as well as in the south of Spain, the elimination of infested trees has not been applied systematically as soon as the pest were detected. The possibility of saving these trees and avoiding serious economic consequences as a result of their elimination, and the practical difficulties of carrying out this operation have unfortunately limited or delayed the destruction of infested trees. The affected trees have then constituted an

important focus for further spread of the red palm weevil.

At present the situation in Egypt is very worrying. Although a small number of date palms are affected, red palm weevil have been recorded in each of the Delta administrative districts, as well as in some orchards along the road between Cairo and Alexandria and even in the capital itself. This extension is certainly partly due to the difficulty of implementing a ban on the exchange or transplanting of offshoots or ornamental adult palms as a rigorous prophylactic measure. Although the red palm weevil does not usually fly very much in the orchards where it is present, it probably flies to new orchards when, after killing all the existing date palms, it does not find enough food.

In Israel, early detection of the pest, when the number of affected trees was still very limited, resulted very quickly in the establishment of a program of integrated pest management. Substantial financial and human resources have been dedicated to avoiding the spread of the pest. Each new affected tree is immediately eliminated. More that 4000 pheromone traps have been located at a high density in 450 ha date plantations along the Jordan Valley. The incorporation of the systemic pesticide Confidor

5 (left). Date palm crown destroyed by red palm weevil.
6 (below). Leaf damage caused by red palm weevil.



7 (left). Injection of insecticide. 8 (right). Pheremone traps.

in the irrigation water has also been used. Despite all these efforts, newly infested trees are still being recorded, three years after the first detection of the pest, and red palm weevils are still being caught in traps.

Conclusions

Even when important and costly means are dedicated to combat the red palm weevil, an efficient solution to fight against it when it first arrives is still missing

However, the main ornamental tall palms planted in the gardens and in the streets of the Mediterranean coast cities are date palms. Thousands of them are imported from Egypt each year directly or indirectly into Spain and other European countries. These palms must have a phytosanitary passport but in specimens such as adult date palms, a large quantity of hidden insects and diseases, can evidently remain undetected, even after very careful phytosanitary scrutiny, and this is, of course, the case red palm weevil eggs and larvae.

In response to the appearance of the red palm weevil in the south of Spain, the Spanish government promulgated a decree in 1996 forbidding the importation of palms from countries where pests of the group of *Rhynchophorus* have been recorded. Four years later this decree was modified, and one of the consequences has been that importation of date palms from Egypt is no longer illegal. This modification to the decree was probably made partly because adult date palms were still arriving in Spain from neighboring countries, with the disappearance of the border controls between European Union member countries

The market for adult date palms from Egypt is very lucrative. It also seems difficult to convince decision-makers and individuals to wait until specimens grown locally became tall enough for landscaping, instead of asking for palms from Egypt. For these two reasons, we think that there is a need for phytosanitary regulations at a European and North African country level to forbid totally the importation of date palms. Otherwise disasters such as the one that has occurred in Almuñecar or, worse still, the one that continues to develop in Egypt, are probable in other places around the Mediterranean. Such

disasters could occur in the coastal cities where *Phoenix* palms constitute one of the characteristic landscape elements; from there, it could extend to the important inland date palm groves of North Africa. It could be also a catastrophe in Elche where the date grove has been nominated as a World Heritage Site. We consider also that European research centres should contribute to help all countries affected by red palm weevil to find a solution to combat this pest.

Literature Cited

Abozuhairah, R.A., P.S. Vidyasagar and V.A. Abraham. 1996. Integrated management of red palm weevil, *Rhynchophorus ferrugineus* in date palm plantations of the Kingdom of Saudi Arabia. Proceedings of the XX International Congress of Entomology. Firenze, Italy, August 1996: 541.

Barranco, P., J. De La Peña and T.Cabello. 1996. El picudo rojo de las palmeras, *Rhynchophorus ferrugineus* (Olivier), nueva plaga en Europa. (Coleoptera, curculionidae). Phytoma España 76: 36–40.

Barranco, P., J. De La Peña, M.M. Martin and T. Cabello. 2000. Rango de hospedantes de *Rhynchophorus ferrugineus* (Olivier,1790) y diámetro de la palmera hospedante. (Coloptera, Curculionidae). Boletin de Sanidad Vegetal Plagas 26: 73–78.

Cox, M.L. 1993. Red palm weevil, *Rhynchophorus ferrugineus* in Egypt. FAO Plant Protection Bulletin 41 (1): 30–31.

El Ezaby, F.A., O. Khalifa and A. El Assal. 1998. Integrated pest management for the control of red palm weevil *Rhynchophorus ferrugineus* Oliv. in The United Arab Emirates, Eastern Region, Al Ain. In Rahman-Al Afifi, M. A. & Al-Sherif Al-Badawy, A. (Eds) Proceedings of the First International Conference on Date Palms. Al-Ain, UAE, 8-10 March 1998. Faculty of Agricultural Sciences, UAE University: 269–281.

Esteban J.R., J.L. Yela, A. Jiménez and F.Beitia. 1998. - Biología del curculiónido ferruginoso de las palmeras *Rhynchophorus ferrugineus* (Olivier) en laboratorio y campo: ciclo en cautividad, peculiaridades biológicas en su zona de introducción en España y métodos biológicos de detecccción y posible control (Coleoptera: *Curculionida: Rhynchophorinae*). Boletin de Sanidad Vegetal Plagas 24: 737–748.

Faghih, A.A. 1996. The biology of red palm weevil, *Rhynchophorus ferrugineus* Oliv. (Coleopter, Curculionidae) in Savaran region (Sistan province, Iran). Applied Entomological Phytopathology 63: 16–86.

9. Fall of a date palm caused by red palm weevil.

10 (above). Perfusion of entomopathogenic nematodes.
11 (below). Extraction of a large number of larvae and cocoons from an infected but not eliminated palm.

FERRY, M. 1996. La crise du secteur phoenicicole dans les pays méditerranéens. Quelles recherches pour y répondre?. In: FERRY, M. & GREINER D. (Eds) Proceedings of the plenary sessions of the Elche International Workshop on Date Cultivation in Oasis Agriculture of Mediterranean Countries. Elche, Spain 25-27 April 1995. Options méditerranéennes 28:129–156.

GOMEZ VIVES, S. AND M. FERRY. 1999. Attempts at biological control of date-palm pests recently found in Spain. In: CANARD M. & BEYSSAT-ARNAOUTY V. (Eds) Proceedings of the First Regional Symposium for Applied Biological Control in Mediterranean Countries. Cairo, 25–29 October 1998. Imprimerie Sacco, Toulouse, France: 121–125.

KEHAT, M. 1999. Threat to Date Palms in Israel, Jordan and the Palestinian Authority by the Red Palm Weevil, *Rhynchophorus ferrugineus*. Phytoparasitica 27: 107–108.

SHAMSELDEAN, M.M. AND M.M. ABD-ELGAWAD. 1994. Laboratory evaluation of six Egyptian isolates of heterorhabditid nematodes for control of the red palm weevil. Egyptian Journal of Applied Science 9: 670–679.