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Data Sheets on Quarantine Pests

Ceratitis rosa

IDENTITY

Name: *Ceratitis rosa* Karsch
Synonyms: *Pterandrus rosa* (Karsch)
Taxonomic position: Insecta: Diptera: Tephritidae
Common names: Natal fruit fly, Natal fly (English)
Mouche des fruits de Natal (French)
Notes on taxonomy and nomenclature: *C. rosa* belongs to subgenus *Pterandrus*.
Bayer computer code: CERTRO
EPPO A1 list: No. 237
EU Annex designation: I/A1 - as *Pterandrus rosa*

HOSTS

C. rosa is a polyphagous species, attacking for example apples (*Malus pumila*), apricots (*Prunus armeniaca*), avocados (*Persea americana*), *Citrus*, *Fortunella*,, guavas (*Psidium guajava*), figs (*Ficus carica*), grapes (*Vitis vinifera*), litchis (*Litchi chinensis*), mangoes (*Mangifera indica*), pawpaws (*Carica papaya*), peaches (*Prunus persica*), pears (*Pyrus communis*), plums (*Prunus domestica*), quinces (*Cydonia oblonga*) and tomatoes (*Lycopersicon esculentum*). The hosts in the EPPO region would be the appropriate species from this list.

GEOGRAPHICAL DISTRIBUTION

EPPO region: Absent.
Africa: Angola, Ethiopia, Kenya, Malawi, Mali, Mauritius, Mozambique, Nigeria, Réunion, Rwanda, South Africa, Swaziland, Tanzania, Uganda, Zaire, Zambia, Zimbabwe.
EU: Absent.
Distribution map: See CIE (1985, No. 153).

BIOLOGY

Detailed biological data on *C. rosa* is lacking, but this species presumably resembles *C. capitata* (EPPO/CABI, 1996b) in biology and survival capacity (possibly, in view of its essentially tropical distribution, it is even less tolerant of winter cold).

DETECTION AND IDENTIFICATION

Symptoms

Attacked fruit usually shows signs of oviposition punctures.

Morphology

C. rosa, like other *Ceratitis* spp., has banded wings, and a swollen scutellum which is marked yellow and black. The pattern of grey flecks in the basal wing cells distinguishes *Ceratitis* spp. from most other genera of tephritids.

Larva

The larva of *C. rosa* has been illustrated by Orian & Moutia (1960).

Adult

Colour: Wing bands and general body colour brown; costal band starting beyond the end of vein R1, and separated from discal crossband by a hyaline area at the end of R1; apical section of vein M not crossed by an infuscate area.

Head: Anterior pair of orbital setae not modified in any way.

Thorax: Scutellum marked black and yellow, with yellow lines or areas meeting margin, such that each apical scutellar seta is based in or adjacent to a yellow stripe; male mid-femur without stout ventral setae; mid-tibia with rows of stout setae along the distal half of both the anterior and posterior edges giving a feathered appearance. Wing length 4-6 mm.

The males of most species of subgenus *Pterandrus* have rows of stout setae on both the anterior and posterior edges of each mid-tibia, giving a feathered appearance. *C. rosa* can be separated from most other members of this subgenus by having this feathering confined to the distal half of the tibia and by lacking stout setae on the underside of the mid-femur. The males also lack the spatulate head appendages of subgenus *Ceratitis*. Unfortunately there is no simple method of recognizing females, except that *Pterandrus* species tend to have brown wing bands and a generally brown body colour, which contrasts with the yellow markings of *C. capitata*.

Detection and inspection methods

C. rosa can be monitored by traps baited with male lures. Like *C. capitata*, and members of subgenera *Ceratitis* and *Pterandrus* in general, it is attracted to trimedlure and terpinyl acetate, but not methyl eugenol or cue lure. The responses to baits of 16 *Ceratitis* species were tabulated by Hancock (1987).

Trimedlure (t-butyl-4(or 5)-chloro-2-methyl cyclohexane carboxylate) is the most widely used lure for *C. capitata* and the following information could also be relevant for *C. rosa*. The history of trimedlure development and the problems of isolating the best of the eight possible isomers are discussed by Cunningham (1989). The lure is usually placed on a cottonwool wick suspended in the middle of a plastic trap that has small openings at both ends; Drew (1982) describes the Steiner trap. Lure can either be mixed with an insecticide or a piece of paper dipped in dichlorvos can be placed in the trap. Traps are usually placed in fruit trees at a height of about 2 m above ground and should be emptied regularly as it is possible to catch hundreds of flies in a single trap left for just a few days, although the lure may remain effective for a few weeks. A review of the biological aspects of male lures is presented by Cunningham (1989) and the use of lures is described more fully by Drew (1982).

MEANS OF MOVEMENT AND DISPERSAL

Adult flight and the transport of infested fruit are the major means of movement and dispersal to previously uninfested areas.

PEST SIGNIFICANCE

Economic impact

C. rosa is highly polyphagous and causes damage to a very wide range of unrelated fruit crops. It tends to displace *C. capitata* in some areas where both species occur (Hancock, 1989).

Control

When detected, it is important to gather all fallen and infected host fruits, and destroy them. Traps containing male lures should be used to monitor population size and spread continuously (Ramsamy, 1989). Insecticidal protection is possible by using a cover spray or a bait spray (Schwartz, 1993). Malathion is the usual choice of insecticide for fruit fly control and this is usually combined with protein hydrolysate to form a bait spray (Roessler, 1989); practical details are given by Bateman (1982). Bait sprays work on the principle that both male and female tephritids are strongly attracted to a protein source from which ammonia emanates. Bait sprays have the advantage over cover sprays that they can be applied as a spot treatment so that the flies are attracted to the insecticide and there is minimal impact on natural enemies.

Phytosanitary risk

C. rosa is included in the broad category "non-European Trypetidae" which appears in the EPPO A1 list (OEPP/EPPO, 1983). It is also of quarantine significance for JUNAC and OIRSA. As for *Bactrocera dorsalis* (EPPO/CABI, 1996a), the potential of *C. rosa* to establish in the southern part of the EPPO region may be limited to subtropical areas, where it could cause direct damage. In a recent review of the risk presented by exotic *Ceratitis* spp. for the EPPO region,, *C. rosa* was considered the only really important species, in view of its much wider host range. Besides, in any area where temporary adventive populations could appear, its presence could lead to severe additional constraints for export of fruits to uninfested areas in other continents.

PHYTOSANITARY MEASURES

Consignments of fruits of *Carica papaya*, *Citrus*, *Fortunella*, *Malus*, *Mangifera indica*, *Persea americana*, *Prunus armeniaca*, *Prunus domestica*, *Prunus persica*, *Psidium guajava*, *Pyrus* and *Vitis vinifera* from countries where *C. rosa* occurs should be inspected for symptoms of infestation and those suspected should be cut open in order to look for larvae. EPPO recommends that such fruits should come from an area where *C. rosa* does not occur, or from a place of production found free from the pest by regular inspection for 3 months before harvest. By analogy with *C. capitata*, fruits may also be treated in transit by cold treatment (e.g. 18, 20 or 22 days at 0.6, 1.1 or 1.7°C, respectively) or, for certain types of fruits, by vapour heat (e.g. keeping at 43°C for 4-6 h) (USDA, 1994). Ethylene dibromide was previously widely used as a fumigant but is now generally withdrawn because of its carcinogenicity; methyl bromide is less satisfactory, damaging many fruits and reducing their shelf life, although treatment schedules are available (e.g. 40 g/m^3 for 2 h at 21-29.5°C; USDA, 1994).

Plants of host species transported with roots from countries where *C. rosa* occurs should be free from soil, or the soil should be treated against puparia. The plants should not carry fruits. Importation of such plants may indeed be prohibited.

BIBLIOGRAPHY

Bateman, M.A. (1982) Chemical methods for suppression or eradication of fruit fly populations. In: *Economic fruit flies of the South Pacific Region* (Ed. by Drew, R.A.I.; Hooper, G.H.S.; Bateman,

M.A.), pp. 115-128. 2nd edition. Queensland Department of Primary Industries, Brisbane, Australia.

CIE (1985) *Distribution Maps of Pests, Series A* No. 153 (revised). CAB International, Wallingford, UK.

Cunningham, R.T. (1989) Biology and physiology; parapheromones. In: *World crop pests 3(A). Fruit flies; their biology, natural enemies and control* (Ed. by Robinson, A.S.; Hooper, G.), pp. 221-230. Elsevier, Amsterdam, Netherlands.

Drew, R.A.I. (1982) Fruit fly collecting. In: *Economic fruit flies of the South Pacific Region* (Ed. by Drew, R.A.I.; Hooper, G.H.S.; Bateman, M.A.), pp. 129-139. 2nd edition. Queensland Department of Primary Industries, Brisbane, Australia.

EPPO/CABI (1996a) *Bactrocera dorsalis*. In: *Quarantine pests for Europe*. 2nd edition (Ed. by Smith, I.M.; McNamara, D.G.; Scott, P.R.; Holderness, M.). CAB International, Wallingford, UK.

EPPO/CABI (1996b) *Ceratitis capitata*. In: *Quarantine pests for Europe*. 2nd edition (Ed. by Smith, I.M.; McNamara, D.G.; Scott, P.R.; Holderness, M.). CAB International, Wallingford, UK.

Hancock, D.L. (1987) Notes on some African Ceratitinae (Diptera: Tephritidae), with special reference to the Zimbabwean fauna. *Transactions of the Zimbabwe Scientific Association* **63**, 47-57.

Hancock, D.L. (1989) Pest status; southern Africa. In:
World crop pests 3(A). Fruit flies; their biology, natural enemies and control (Ed. by Robinson, A.S.; Hooper, G.), pp. 51-58. Elsevier, Amsterdam, Netherlands.

OEPP/EPPO (1983) Data sheets on quarantine organisms No. 41, Trypetidae (non-European). *Bulletin OEPP/EPPO Bulletin* **13** (1).

Orian, A.J.E.; Moutia, L.A. (1960) Fruit flies (Trypetidae) of economic importance in Mauritius. *Revue Agricole et Sucrière de l'Ile Maurice* **39**, 142-150.

Ramsamy, M.P. (1989) A survey of three main tephritids and their hosts in Mauritius and some studies on their control with attractive chemical traps. *Insect Science and its Application* **10**, 383-391.

Roessler, Y. (1989) Control; insecticides; insecticidal bait and cover sprays. In: *World crop pests 3(B). Fruit flies; their biology, natural enemies and control* (Ed. by Robinson, A.S.; Hooper, G.), pp. 329-336. Elsevier, Amsterdam, Netherlands.

Schwartz, A. (1993) Fruit fly and control measures on table grapes. *Deciduous Fruit Grower* **43**, 109-111.

USDA (1994) *Treatment manual.* USDA/APHIS, Frederick, USA.

White, I.M.; Elson-Harris, M.M. (1992) *Fruit flies of economic significance, their identification and bionomics*. CAB International, Wallingford, UK.