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Data Sheets on Quarantine Pests

Carposina niponensis

IDENTITY

Name: *Carposina niponensis* (Walsingham)
Synonyms: *Carposina sasakii* Matsumura
Carposina persicana Matsumura
Taxonomic position: Insecta: Lepidoptera: Carposinidae
Common names: Peach fruit moth (English)
Carpocapse du pêcher (French)
Momo-Hime-Sinkuiga (Japanese)
Notes on taxonomy and nomenclature: *C. niponensis* has two subspecies - *niponensis* confined to the Far East and a pest of Rosaceae, and *ottawana* confined to Canada and feeding only on *Cornus* and *Ribes*. The latter does not attack Rosaceae and is not recorded as a pest (Davis, 1968).
Bayer computer code: CARSNI
EPPO A1 list: No. 163
EU Annex designation: II/A1

HOSTS

Apples, peaches and pears. Apricots, *Crataegus* spp., plums, quinces and *Ziziphus mauritiana* are also noted as hosts (Shutova, 1970).

GEOGRAPHICAL DISTRIBUTION

EPPO region: Russia (Far East).
Asia: China (north-eastern provinces), Japan, Korea Democratic People's Republic, Korea Republic, Russia (Far East).
North America: Canada (but only the harmless subspecies *C. ottawana*, see Notes on taxonomy and nomenclature).
EU: Absent.
Distribution map: See CIE (1990, No. 511).

Although *C. niponensis* occurs in the Far Eastern provinces of Russia, it does not occur in the European part or in Siberia and is a quarantine pest for Russia.

BIOLOGY

C. niponensis overwinters as hibernating larvae in cocoons in the soil, though some larvae may overwinter in fruit in storage (Shutova, 1970). The larvae pupate in the spring in fresh cocoons on the surface of the soil and the moths emerge about 12 days later. The flight period starts in late May or early June in Korea Democratic People's Republic (Muramatsu, 1927) and ends in mid-June, with the second generation of adults flying from mid-August to early September. In China (Hwang, 1958), Japan (Yago & Ishikawa, 1936) and Korea Republic (Lee *et al.*, 1984), the overwintering larvae may pupate at any time between mid-May and late July, depending on soil temperature and soil humidity. The moths fly from

mid-June until late September and there is considerable overlapping of broods. The second generation is only partial and first-generation larvae leaving the fruit in July may go into hibernation (Chang *et al.*, 1977). The emergence of the first generation of moths in Hokkaido (Japan) has been found to be well synchronized with the growth of the main apple cultivars there (Kajino & Nakao, 1977).

Several eggs are laid on each fruit, usually near the calyx. Up to 13 larvae have been recorded in a single pear (Yago & Ishikawa, 1936). One female can carry up to 350 mature eggs (Ohira, 1989) and lays an average of about 100 eggs (Gibanov & Sanin, 1971). The young larvae bore into the fruit, usually near the calyx, but reject the skin. Later, they may move from one fruit to another. Susceptibility to penetration by the young larvae varies with growth stage, species and cultivar of fruit. These factors (in addition to temperature) affect rate of development of the larvae (Gibanov & Sanin, 1971; Chang *et al.*, 1977).

DETECTION AND IDENTIFICATION

Symptoms

The larvae tunnel all parts of the fruit, feeding on the fleshy parts and on the seeds. Damage to peach may be confused with that due to *Cydia molesta* in Japan and Korea (an A2 quarantine pest occurring in Europe; EPPO/CABI, 1996a). Damage to apple resembles that caused by larvae of the fruit fly *Rhagoletis pomonella* (a North American pest on the A1 list; EPPO/CABI, 1996b) and not by the caterpillars of *Cydia pomonella*, the familiar European codling moth. Several larvae may feed in each fruit. Infested apples exude a sticky gum, pears turn yellow and apricots ripen unevenly (Gibanov & Sanin, 1971).

Morphology

Eggs

Elliptical, light yellowish-brown in colour with a granulated chorion, rose-red. Distinctive ring of spines round the apex, possibly encircling the micropyle (Wu & Hwang, 1955; Shutova, 1970).

Larva

Orange-red when newly hatched, changing to milky-white and then back to orange-red at maturity. Mature larva up to 13 mm long, with no anal comb. The setation is illustrated by Wu & Hwang (1955).

Pupa

Reddish-brown in cocoon.

Adult

Wing span 15-19 mm. Long narrow forewings, mottled grey in colour, with a darker area along the anterior margin; hind wings with a fringe of long scales, and only five veins arising from the median cell. The genitalia have been illustrated by Danilevskii (1958) and Wu & Hwang (1955).

MEANS OF MOVEMENT AND DISPERSAL

The moth normally flies only short distances. In China, 80% of marked adults dispersed randomly within a radius of 100 m and the furthest distance an adult dispersed was 225 m (Sun *et al.*, 1987). Hence, international dispersal by flight is extremely unlikely. Larvae can survive for long periods in stored fruits, so imported fruits are the most likely means of entry. *C. niponensis* is found by USDA inspectors almost every year on raw fruit from Japan and Korea.

PEST SIGNIFICANCE

Economic impact

C. niponensis is considered one of the most important pests of pome fruits in the Far East. On apples in Japan, Korea and China, it 'may cause heavy losses if not controlled' (USDA, 1958). In China (Hwang, 1958), it is recorded as destroying about one-third of the apple crop in Liaoning province (with *Cydia inopinata* - see above). In the Primor'e province of Russia, *C. niponensis* is the most damaging fruit moth, more so than *Cydia pomonella*. Damage to pears can reach 100% in some cases, but apples are less heavily infested (40-100%) (Sytenko, 1960; Pavlova, 1970; Gibanov & Sanin, 1971).

Control

Control of the pest can be successfully achieved by applying either fenitrothion, parathion, fenvalerate or deltamethrin at the oviposition peaks of the first and second generations, in combination with the mechanical removal of fallen fruit (Huan *et al.*, 1987).

There are few records of parasites. *Anilastus* sp. (Hymenoptera: Ichneumonidae) was raised from infested apples in Japan (Pschorn-Walcher, 1964). A fungus, *Isaria fumosorosea*, has been advocated for control (Sekiguchi, 1960). More recently, *Metarhizium anisopliae* has been reported most effective in a comparative study (Yaginuma & Takagi, 1987).

Phytosanitary risk

C. niponensis is an A1 quarantine pest for EPPO (OEPP/EPPO, 1988) and is also of quarantine significance for COSAVE. In the EPPO region, there is no directly analogous pest of fruit, with several larvae surviving in a single fruit. *Argyresthia conjugella* is perhaps the most similar. The pest presents a risk to fruit production in most parts of the EPPO region. While it might only complete one generation per year in northern countries, it seems likely that a partial or complete second generation would be possible over much of Europe. The introduction of *C. niponensis* into the EPPO region could have a severe economic impact on the fruit-growing areas of the region.

PHYTOSANITARY MEASURES

Fruits of host plants from the Far East should be subject to strict requirements. A fumigation schedule for fresh fruit has been published in Russia - 23 g/m^3 methyl bromide for 4 h at >15°C for overwintering caterpillars, with slightly lower doses (17-20 g/m^3) for caterpillars of the summer generation.

In general, all *Chaenomeles*, *Crataegus*, *Cydonia*, *Eriobotrya*, *Malus*, *Prunus*, *Pyrus* and *Ziziphus* plants with roots (especially those with growing medium) should have been grown in an organic medium or growing medium which was treated or tested against *C. niponensis* by an EPPO-recommended procedure if they are coming from a country where the pest occurs. Additionally, the consignment should have been kept under conditions which prevent a reinfestation by the organism (OEPP/EPPO, 1990).

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