

Data Sheets on Quarantine Pests

Anthonomus eugenii

IDENTITY

Name: *Anthonomus eugenii* Cano

Synonyms: *Anthonomus aeneotinctus* Champion

Taxonomic position: Insecta: Coleoptera: Curculionidae

Common names: Pepper weevil (English)
Barrenillo del chile (Spanish)

Bayer computer code: ANTHEU

EPPQ A1 list: No. 202

HOSTS

The main hosts are cultivated *Capsicum* spp., including *C. annuum* and *C. frutescens* (Acosta *et al.*, 1987) and some wild *Capsicum* spp. Other Solanaceae are also attacked, including aubergines (*Solanum melongena*) and many wild *Solanum* spp. (Patrock & Schuster, 1992).

Oviposition and larval development appears to be restricted to these *Capsicum* and *Solanum* spp. Adults may also feed on other Solanaceae such as *Datura stramonium*, *Nicotiana glauca* (Patrock & Schuster, 1992), *Petunia parviflora*, *Physalis pubescens*, tomatoes (*Lycopersicon esculentum*) and a variety of other plants (Elmore *et al.*, 1934). No oviposition was observed on potatoes (*Solanum tuberosum*).

GEOGRAPHICAL DISTRIBUTION

A. eugenii occurs naturally in Mexico from where it has spread through Central America and southern USA in the first part of this century.

EPPQ region: Absent.

North America: Canada (two incidents in British Columbia, one in a retail outlet, one in a glasshouse, both eradicated; Costello & Gillespie, 1993), Mexico (especially in north), USA (Arizona, California, Florida, Georgia, Louisiana, New Mexico, Texas).

Central America and Caribbean: El Salvador (O'Brien & Wibmer, 1982), Guatemala (Calvo-Domingo *et al.*, 1989), Honduras (Andrews *et al.*, 1986), Puerto Rico (first record in 1982; Abreu & Cruz, 1985).

EU: Absent.

BIOLOGY

Egg-to-adult development time at 26-28°C was about 14 days in *Capsicum annuum* and *Solanum americanum* (Patrock & Schuster, 1992). In the laboratory, the egg stage took 3.6 days, the larval stage 9.5 days, the pupal stage 3.3 days and the adult stage 3.14 days (egg to adult 16.4 days) (Gordon & Armstrong, 1990). In Florida (USA), the egg takes 2.5-3 days, larva 6-12 days and pupa 3-6 days to develop. Adults are found in every month of the year except December and January. The winter is usually spent on weeds or old pepper

plants. No diapause was observed (Elmore *et al.*, 1934). Overwintering adults can live for 10 months, but survival is only 2-3 months in the summer.

DETECTION AND IDENTIFICATION

Symptoms

Adults feed on leaves and blossoms and bore into fruits. Early signs are small holes in immature fruits and small circular or oval holes (2-5 mm) in leaves. These can be mistaken for slug or caterpillar damage. Larvae feed on seeds and other tissue in the developing fruits (Costello & Gillespie, 1993).

Morphology

The adult is black, 3 mm long and 1.5-1.8 mm wide (Elmore *et al.*, 1934).

MEANS OF MOVEMENT AND DISPERSAL

A. eugenii can only spread over limited distances naturally, but is liable to be transported internationally in fruits of capsicums and possibly aubergines. This is presumably what has happened in Central America. Adults can survive prolonged cool conditions (2-5°C) for over 3 weeks and be transported as immatures in fresh fruits. Fruits of wild hosts could accidentally contaminate poorly packed consignments.

PEST SIGNIFICANCE

Economic impact

The most important damage to capsicums is the destruction of blossom buds and immature fruits, which turn yellow and fall (Elmore *et al.*, 1934). In Puerto Rico, the theoretical economic injury level was calculated at 0.01 adults per plant, and fruit abortion was the main cause of yield loss (Segarra-Carmona & Pantoja, 1988). There appears to be a direct relationship between pepper weevil damage and internal mould due to *Alternaria alternata* (Bruton *et al.*, 1989). In 1926, losses of 500 000 USD to the Californian pepper crop were reported (Elmore *et al.*, 1934).

Costello & Gillespie (1993) reported serious damage by this weevil to glasshouse peppers in British Columbia (Canada) in summer 1992, but the outbreak was subsequently eradicated.

Control

In Texas, 8-15 insecticide sprays may be used to control infestations (Cartwright *et al.*, 1990). Oxamyl was the most effective insecticide in Puerto Rico (Armstrong, 1994). Bud cluster damage of 1-5% was found to be the best threshold for insecticide treatment. Different thresholds have been defined for low and high-input production systems (Riley *et al.*, 1992). Yellow sticky traps can be used to monitor populations (Riley & Schuster, 1994). There are cultivar differences in susceptibility, mainly arising from the timing of fruit maturation (Berdegue *et al.*, 1994). In Canada, successful eradication was achieved by clearing glasshouses of all crop residues, spraying with hydrated lime, removing all standing water, maintaining 20°C or over for at least 10 days and fumigating with a variety of products.

Phytosanitary risk

A. eugenii has recently been added to the A1 quarantine list of EPPO, but is not a quarantine pest for any other regional plant protection organization. It is predominantly a pest of capsicums in tropical or subtropical climates. It has a capacity to spread from its origin in Mexico to other countries, both in former years (southern USA) and recently

(Puerto Rico). It could probably be a pest of outdoor crops, and survive outdoors, in southern Europe. Experience in Canada shows that it also has the potential to be a serious pest of glasshouse crops in colder countries, although it would not survive outdoors. It has, however, proved possible to eradicate such glasshouse infestations.

PHYTOSANITARY MEASURES

Fruits of capsicum should come from an area where *A. eugenii* does not occur or from places of production found free from the pest during the growing season.

BIBLIOGRAPHY

- Abreu, E.; Cruz, C. (1985) The occurrence of the pepper weevil *Anthonomus eugenii* in Puerto Rico. *Journal of the Agricultural University of Puerto Rico* **69**, 223-224.
- Acosta, N.; Vicente, N.; Abreu, E.; Medina-Gaud, S. (1987) Chemical control of *Meloidogyne incognita*, *Rotylenchus reniformis* and *Anthonomus eugenii* in *Capsicum annum* and *Capsicum frutescens*. *Nematropica* **17**, 163-170.
- Andrews, K.L.; Rueda, A.; Gandini, G.; Evans, S.; Arango, A.; Avedillo, M. (1986) A supervised control program for the pepper weevil, *Anthonomus eugenii* in Honduras, Central America. *Tropical Pest Management* **32**, 1-4.
- Armstrong, A.M. (1994) Insecticides to combat damage by *Anthonomus eugenii* in pepper var. Cubanella in Puerto Rico. *Journal of Agriculture of the University of Puerto Rico* **78**, 23-31.
- Berdegue, M.; Harris, M.K.; Riley, D.W.; Villalon, B. (1994) Host plant resistance on pepper to the pepper weevil, *Anthonomus eugenii*. *Southwestern Entomologist* **19**, 265-271.
- Brunton, B.D.; Chandler, L.D.; Miller, M.E. (1989) Relationships between pepper weevil and internal mold of sweet pepper. *Plant Disease* **73**, 170-173.
- Calvo Domingo, G.; Pacheco, A.B.; French, J.B.; Alvarado, E. (1989) [Economic analysis of the weevil *Anthonomus eugenii* in Zacapa, Guatemala]. *Manejo Integrado de Plagas* **11**, 31-50.
- Cartwright, B.; Teague, T.G.; Chandler, L.D.; Edelson, J.V.; Bentsen, G. (1990) An action threshold for management of the pepper weevil on bell peppers. *Journal of Economic Entomology* **83**, 2003-2007.
- Costello, R.A.; Gillespie, D.R. (1993) The pepper weevil, *Anthonomus eugenii* as a greenhouse pest in Canada. *Bulletin SROP* **16**, 31-34.
- Elmore, J.C.; Davis, A.C.; Campbell, R.E. (1934) The pepper weevil. *USDA Technical Bulletin* No. 447.
- Gordon, R.; Armstrong, A.M. (1990) Biology of the pepper weevil, *Anthonomus eugenii* in Puerto Rico. *Journal of the Agricultural University of Puerto Rico* **74**, 69-73.
- O'Brien, C.W.; Wibmer, G.J. (1982) Annotated checklist of the weevils (Curculionidae *sensu lato*) of North America, Central America and the West Indies (Coleoptera: Curculionoidea). *Memoirs of the American Entomological Institute* **34**, 107.
- Patrock, R.J.; Schuster, D.J. (1992) Feeding, oviposition and development of the pepper weevil (*Anthonomus eugenii*) on selected species of Solanaceae. *Tropical Pest Management* **38**, 65-69.
- Riley, D.G.; Schuster, D.J. (1994) Pepper weevil adult response to colored sticky traps in pepper fields. *Southwestern Entomologist* **19**, 93-107.
- Riley, D.G.; Schuster, D.J.; Barfield, C.S. (1992) Refined action threshold for pepper weevil adults in bell peppers. *Journal of Economic Entomology* **85**, 1919-1925.
- Segarra-Carmona, A.E.; Pantoja, A. (1988) Sequential sampling plan, yield loss components and economic thresholds for the pepper weevil, *Anthonomus eugenii*. *Journal of the Agricultural University of Puerto Rico* **72**, 375-385.