Mini data sheet on *Punctodera chalcoensis*

Added in 2012 – Deleted in 2015

Reasons for deletion:
Punctodera chalcoensis has been included in EPPO Alert List for more than 3 years and during this period no particular international action was requested by the EPPO member countries. In 2015,the Working Party on Phytosanitary Regulations agreed that it could be deleted, considering that sufficient alert has been given.

Punctodera chalcoensis (Nematoda: Heteroderidae) – Mexican corn cyst nematode

Why	*Punctodera chalcoensis* is a cyst nematode which causes economic damage to maize crops in Mexico. Damage observed in the maize-growing area of Huamantla (Tlaxcala state) was first attributed to a Mexican race of *Heterodera punctata.* In 1976, it was found that the Mexican specimens differed from *P. punctata* and belonged to a distinct species which was called *Punctodera chalcoensis* (type specimens were collected near Chalco, state of Mexico). Considering the importance of maize cultivation in the EPPO region, the EPPO Panel on Diagnostics in Nematology suggested adding *P. chalcoensis* to the EPPO Alert List.
Where	*P. chalcoensis* is widespread in Mexico in temperate maize-growing areas. Its presence has been reported at least in the following states: Jalisco, México, Michoacán, Puebla, Querétaro, Tlaxcala, Veracruz. Considering the very limited world distribution of *P. chalcoensis* and the fact that it feeds only on maize and teosinte (a close relative), it is suggested that *P. chalcoensis* is indigenous to Central Mexico and that it has co-evolved there with maize. **North America:** Mexico (Jalisco, México, Michoacán, Puebla, Querétaro, Tlaxcala, Veracruz). **EPPO region:** absent.
On which plants	The host range of *P. chalcoensis* is limited to maize (*Zea mays*) and teosinte (*Euchlaena mexicana*).
Damage	Infested maize fields show patches of stunted and chlorotic plants. In heavily infested sandy soils, plants are markedly stunted with chlorotic leaves exhibiting pale colour stripes. The root system of attacked plants is generally poorly developed. Two months after planting (at the beginning of the rainy season in Mexico), large numbers of white females can be observed on the root surface of infested plants. Damage is more severe during the rainy season, as precipitation stimulates the emergence of juveniles and subsequently favours the invasion of the roots. *P. chalcoensis* survives and reproduces well in all soil types, but damage is more severe on volcanic sandy soils. Attacked roots are also prone to secondary infections by other pathogens. Studies carried out in the 1980s showed that under glasshouse conditions, a yield reduction of about 60% could be obtained with maize plants grown in heavily infested soils. Under certain conditions, especially when pathogenic fungi are present, it has been reported that *P. chalcoensis* could significantly reduce maize yield (up to 90%). Although, yield losses in maize fields infested by *P. chalcoensis* are considered to be high in Mexico, information on economic losses is generally lacking. *P. chalcoensis* is a sedentary endoparasitic nematode. It has one generation per year and survives winter in diapause. A period of hibernation is required to break diapause and stimulate the emergence of second-stage juveniles in the following spring. Under experimental conditions, the life cycle is completed in approximately 30 to 50 days. The males mature earlier than the females, emerge from the host root, then move towards the females and mate with them. Eggs are produced after fertilization and are retained in the female body. Females form spherical cysts, pale to dark brown, darkening with age which may contain 200 to 400 eggs. Second-stage juveniles emerge from the cysts, penetrate host roots and establish a specialized feeding site (syncytium) in root tissues.

Dissemination	As with most cyst nematodes, dissemination is largely ensured by passive transport with soil, water, and plant material. The mobile stages (juveniles, males) can only move over very short distances. There is no data on the longevity of cysts in the soil, but as for other cyst nematode species it is likely that *P. chalcoensis* cysts remain viable in the soil for several years.
Pathway	Infested soil and growing media, plants for planting, bulbs and tubers from areas where *P. chalcoensis* occurs are the most probable pathways to introduce this pest into the EPPO region. Soil attached to machinery, tools, footwear, or plant products is also another possible pathway.
Possible risks	Maize is widely grown in the EPPO region and is of major economic importance. Cyst nematodes generally are difficult to control once established because of the persistence of the cysts in the soil. In Mexico, differences have been observed in maize susceptibility but no resistant cultivars have been identified. There is no data on the impact of crop rotation to diminish the nematode populations, although it is likely to be effective. Other cultural methods, such as early sowing (before hatching of juveniles) and good plant nutrition are likely to reduce the impact of the pest. Nematicide treatments are becoming more and more difficult to apply in field crops for economic and environmental reasons. Although more data is needed on the economic impact of *P. chalcoensis* on maize, it is generally reported from Mexico that it can reduce maize yield and cause economic losses. As it has been observed in temperate areas of Mexico (e.g. in regions above 2000 m altitude), it seems likely that this species has the potential to establish in the EPPO region, although more data on its biology would be needed to verify this assumption.
Sources	CABI Crop Protection Compendium. Data sheet on *Punctodera chalcoensis*. http://www.cabi.org

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