

Data Sheets on Quarantine Pests

*Gymnosporangium globosum***IDENTITY**

Name: *Gymnosporangium globosum* (Farlow) Farlow

Synonyms: *Gymnosporangium fuscum* var. *globosum* Farlow

Taxonomic position: Fungi: Basidiomycetes: Uredinales

Common names: American hawthorn rust (English)

Notes on taxonomy and nomenclature: For information on the taxonomy of *Gymnosporangium* spp. see Kern (1973).

Bayer computer code: GYMNGL

EPP0 A1 list: No. 254

EU Annex designation: I/A1 - as *Gymnosporangium* spp. (non-European)

HOSTS

The main aecial hosts are *Crataegus* spp. (hawthorn), which occur wild or are grown as ornamentals throughout much of Europe. Species of *Amelanchier*, *Malus*, *Pyrus* and *Sorbus* are also hosts. The telial host is *Juniperus virginiana*, occasionally grown in central Europe as a timber tree and elsewhere as an ornamental tree or dwarf shrub. It may be noted that there are several other *Gymnosporangium* spp. on hawthorn in North America, which are more specific to this host, including the European *G. clavariiforme* (Farr *et al.*, 1989).

GEOGRAPHICAL DISTRIBUTION

EPP0 region: Absent.

North America: Canada (Ontario, Quebec, Saskatchewan), Mexico, USA (Connecticut and other eastern states, plus Alaska, Colorado, Illinois, North Dakota, Nebraska, Oklahoma, South Dakota, Texas).

EU: Absent.

Distribution map: See CMI (1989, No. 123).

BIOLOGY

G. globosum, like other *Gymnosporangium* spp., is heteroecious in that it requires *Juniperus* and rosaceous hosts of subfamily Pomoideae to complete its life cycle. Telia are produced on stems, twigs and branches of *J. virginiana* in the spring. In moist conditions, the telia germinate *in situ* and produce basidiospores which are dispersed and are able to infect nearby *Crataegus* spp. Infection of *J. virginiana* by *G. globosum* is known to be persistent for more than 1 year.

Infection from basidiospores gives rise to pycnia borne on the upper surface of the leaves of *Crataegus*; they are visible from late spring to early summer. Later, aeciospores are produced inside tubular protective sheaths (peridia) on the underside of the leaf. Fruit infection by *G. globosum* is rare. The aeciospores are released when the peridium ruptures

and are capable of being wind-borne over long distances to *Juniperus*. After germinating on *J. virginiana*, an overwintering latent mycelium is produced. Infection of *Crataegus* does not persist after infected leaves have fallen. The telial state appears on *J. virginiana* in the spring to begin the life cycle again. For more information see Peterson (1967).

DETECTION AND IDENTIFICATION

Symptoms

On *Juniperus virginiana*, *G. globosum* causes galls on stems, twigs and branches (see Morphology). On *Crataegus*, the most conspicuous symptoms are the appearance of the aecia and pycnia on the leaves (Morphology). Infections on fruits are rare with *G. globosum*.

Morphology

On *Juniperus virginiana*

Telia are formed on globose galls, 3-10 mm on the sides of twigs or branches. They are conic, 3-12 mm high x 1.3 mm wide, chestnut-brown. Teliospores are two-celled, ellipsoid, 35-40 x 17-24 µm, wall 0.5-2.5 µm thick.

On *Crataegus*

Aecia are roestelioid, hypophyllous with the peridia 3-5 mm high, lacerate at the sides. The aeciospore mass is rusty-brown. Aeciospores are 15-23 µm in diameter. Details can be found in Laundon (1977).

Detection and inspection methods

The inspection of imported *Juniperus* which may have latent infection is particularly important. A secure quarantine procedure would involve retention under closed conditions for 2 years and frequent inspection during January-May.

MEANS OF MOVEMENT AND DISPERSAL

Under natural conditions, spread of *G. globosum* is by basidiospore dispersal to *Crataegus*, and by wind-borne aeciospores to *Juniperus virginiana*. In international trade, all plants of *J. virginiana* from North America are liable to be infected by *G. globosum*. Like other *Gymnosporangium* spp., *G. globosum* can be latent during winter (the probable importing period) and may not be detectable at pre-export phytosanitary certification. Infection may also have remained latent on the plants in the previous growing season.

Introduction of *G. globosum* on commercial importations of *Crataegus* is very unlikely as infection is not persistent in the dormant stage. Fruits are not infected.

PEST SIGNIFICANCE

Economic impact

G. globosum can be severe on *Crataegus* seedlings in nurseries. Aldwinckle (1990) rates it as a minor pathogen of fruit crops, compared with *G. clavipes* and *G. juniperi-virginianae*. In a study of field susceptibility of apple cultivars to three *Gymnosporangium* spp. (Warner, 1990), *G. globosum* caused only minor leaf symptoms and was much less severe than *G. juniperi-virginianae* (EPPO/CABI, 1996). The fungus can cause problems on *Juniperus virginiana*, which is an important timber and amenity tree in North America.

Control

G. globosum can be adequately controlled on apples by routine fungicide applications (e.g. sterol-inhibiting fungicides). Varietal differences in susceptibility have been studied in both

apples and *Juniperus virginiana*. It is not recommended to plant *J. virginiana* close to orchards, for the sake of either host.

Phytosanitary risk

G. globosum is one of the non-European *Gymnosporangium* spp. listed as A1 quarantine organisms by EPPO (OEPP/EPPO, 1983). It is also listed as a quarantine pest by COSAVE and IAPSC. Other *Gymnosporangium* spp. already occur on apples and *Crataegus* in Europe, e.g. *G. tremelloides* on apple and *G. confusum* on *Crataegus* (Smith *et al.*, 1988). Neither of these diseases is very important. *G. globosum* has *J. virginiana* as its alternate host, a species which has only locally and to a limited extent been introduced into Europe. On the face of it, *G. globosum* presents a much lesser quarantine risk for Europe than its sister species from North America (*G. juniperi-virginianae* and *G. clavipes*).

PHYTOSANITARY MEASURES

Measures such as those proposed for *G. juniperi-virginianae* would also be suitable for *G. globosum* (EPPO/CABI, 1996).

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