

STUDIES IN PLANT PATHOGENIC FUNGI-I
Gnomonia radicola, spec. nov., a new pathogen of roses

M.E. NOORDELOOS, H.A. VAN KESTEREN & JOHANNA W. VEENBAAS-RIJKS

*Plant Protection Service, Wageningen**

A new species of *Gnomonia* is described causing wilt of roses grown as cut-flowers in greenhouses on artificial substrate. Its main characters are relatively large perithecia with an extremely long beak and narrow, fusoid spores without appendages.

Roses are widely grown as ornamentals in gardens, parks etc. and as cut-flowers. The overground parts of these plants are threatened by a fairly large number of pathogenic fungi such as rusts, powdery mildew, *Botrytis*, and a number of ascomycetes, causing a variety of disease symptoms like leaf-spots, cankers and die-back of shoots. Wilting is another phenomenon, usually caused by fungi that attack the roots or 'stem-base'. Well-known causal organisms of wilting in roses are *Verticillium*-species, *Phytophthora nicotianae*, and *Cylindrocladium scoparium*.

Recently a new wilting disease occurred in some glasshouses in the Netherlands where roses are grown as cut-flowers on an artificial substrate. The wilting was caused by a severe root-rot. On the diseased roots numerous perithecia were seen of an ascomycete. Since no other pathogenic fungi could be isolated from these roots, this ascomycete apparently was the cause of the wilting. On account of the flask-shaped perithecia with a centrally inserted, very long beak and the fusoid, uniseptate spores, the ascomycete was readily identified as a species of *Gnomonia*. The large fruit-bodies, inappendiculate spores, and the habitat made us decide to describe this remarkable *Gnomonia* as a new species.

Gnomonia radicola Noordel., Kest. & Veenb., spec. nov. — Fig. 1

Perithecia globosa, in vivo 300–350 μm alta, in vitro ad 500 μm alta, rostra in vivo 600–950 μm longa, 85–150 μm lata et 20–70 μm apicem versus, atrobrunnea vel atra. Asci 30–42 \times 4–6.5 μm , unitunicati, subcylindracei vel clavati interdum versus apicem truncati, octospori. Ascosporae 9–15 \times 1.3–2.5 μm , uniseptatae, septo medio vel submedio, inappendiculateae. In radicibus rosarum fruticosis.

Holotypus: In radicibus rosarum 'Candy Rose', 10.XII.1987, Vleuten, prov. Utrecht, Netherlands (L; Herb. PD 2894; cult. CBS No. 692.88).

Stroma not formed. Perithecia globose, in vivo 300–350 μm in diam., in vitro up to 500 μm in diam., with central ostiolar beak, in vivo 600–950 μm long, in vitro up to 1250 μm long, 80–150 μm broad at base gradually tapering towards 20–70 μm wide apex; peridium blackish brown to black, composed of several layers of 15–20 μm wide cells. Asci numerous, 25–42 \times 4–6.5 μm , subcylindrical to clavate, stipitate, with a rounded or truncate

* Address: Postbox 9102, 6700 HC Wageningen, Netherlands.

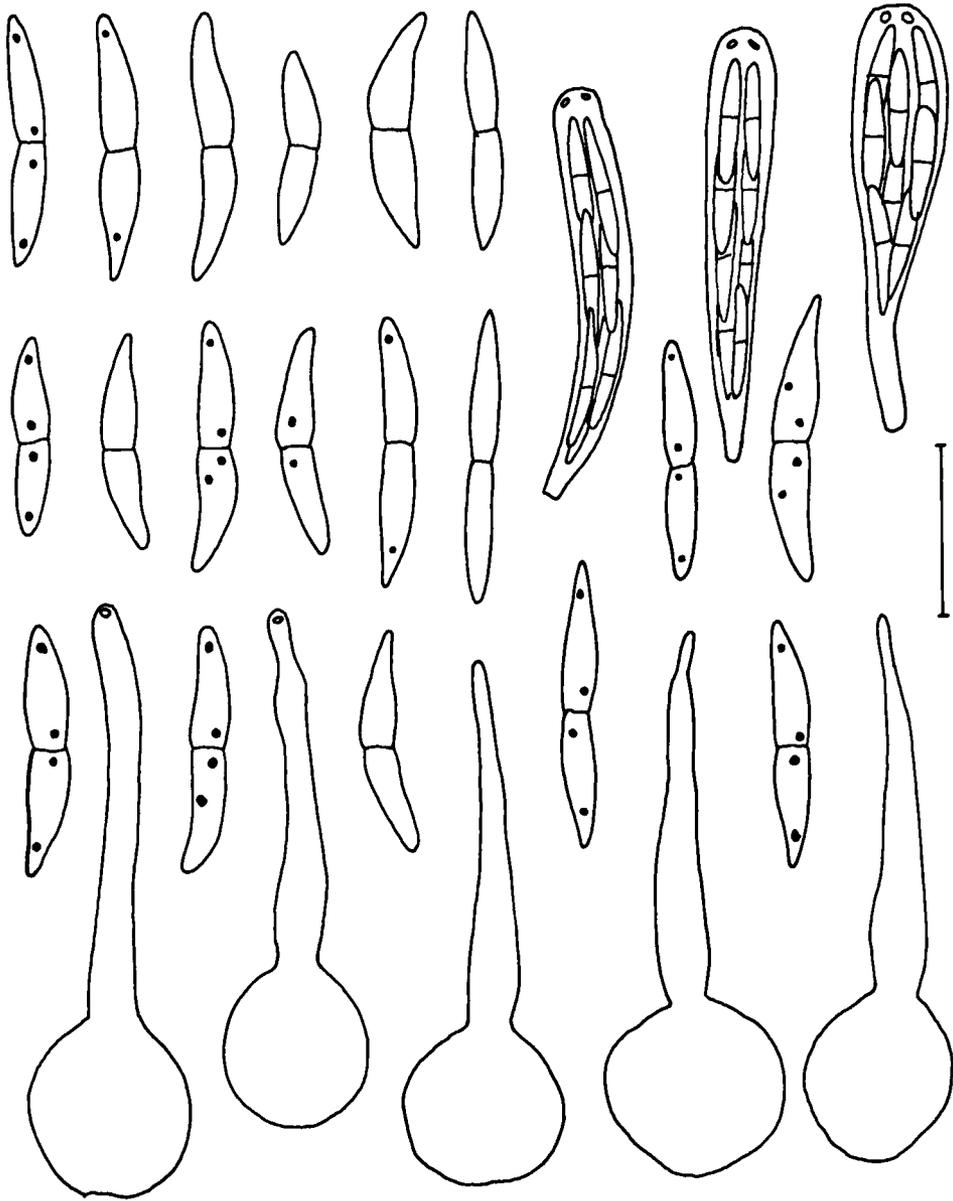


Fig. 1. *Gnomonia radicolica*: asci, ascospores, and perithecia [bar represents 10 μm (spores), 20 μm (asci), and 300 μm (perithecia) respectively]. All figs. from holotype.

apex, provided with a distinct apical ring, unitunicate, 8-spored. Ascospores 2(-3)-seriate, 9-15 × 1.3-2.5 µm, Q = 5-8, average Q = 6.5; fusoid, with median or submedian septum, often somewhat constricted at septum and tapering towards acute ends, without appendages, straight or somewhat curved, usually with two small oil-drops in each cell.

HABITAT. — Semisubmerged in cortex of roots of *Rosa* species.

COLLECTIONS EXAMINED. — NETHERLANDS: prov. Utrecht: Vleuten, 10 Dec. 1987, *G. Alicaris* (holotype, PD 2894, on *Rosa* 'Candy Rose'); Aalsmeer, 21 Oct. 1987, *M. de Witte* (on *Rosa* 'Friso').

Gnomonia radiculicola grows easily in pure culture, though slowly. On Cherry Agar and Oat meal Agar it develops radiating blackish mycelial strands that branch increasingly towards the margin of the petridisk, forming numerous primordial perithecia. Aerial mycelium is hardly present. On OA the reverse is typically yellow pigmented. The perithecia on the mycelium do not ripen easily but when induced on a sterilized stem of *Lupinus* ripe ascospores are formed within one month. The perithecia produced in vitro generally are slightly larger than those in vivo on the roots.

Gnomonia radiculicola keys out in section *Angustispora* Barr on account of the narrow ascospores and relatively wide beaks of the perithecia (Barr, 1978). Within this section it comes very close to *Gnomonia comari* P. Karst., because of the spores without appendages. The latter species is a well-known pathogen of herbaceous Rosaceae, especially on strawberry (*Fragaria × ananassa*) where it causes rot of flowers, fruits and petioles. Besides in the habitat and pathogenous behaviour, *G. comari* also differs morphologically from *G. radiculicola* on account of the smaller perithecia with a shorter beak, and spores that have predominantly submedian septa. In the monograph by Monod (1983) our *Gnomonia* keyed out near *G. comari*, but also near *G. gei-montani* Kanojevic, from which it clearly differs, however, by the appendiculate spores and broad beaks of the perithecia.

Another *Gnomonia* that is pathogenic to Rose, viz. *G. rosae* (Fuckel) Sacc. differs morphologically from *G. radiculicola* by the size and shape of the perithecia and by having appendiculate spores. It causes leaf-spots and die-back of young twigs and is only weakly parasitic. Further studies on the pathogenous properties of *Gnomonia radiculicola* are in progress.

ACKNOWLEDGEMENT

Dr. H. A. van der Aa, CBS, Baarn, is greatly thanked for critically reading the manuscript of this paper and providing valuable comments.

REFERENCES

- BARR, M.E. (1978). The *Diaporthales* in North America with emphasis on *Gnomonia* and its segregates. Mycologia Memoir 7. Lehre.
- BOLAY, A. (1972). Contribution à la connaissance de *Gnomonia comari* Karsten. Etude taxonomique, phytopathologique et recherches sur sa croissance in vitro. In Ber. schweiz. bot. Ges. 81: 398-482.
- MONOD, M. (1983). Monographie taxonomique des *Gnomoniaceae* (Ascomycetes de l'ordre des *Diaporthales*) I. Beih. Sydowia 9.