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SHORT COMMUNICATIONS

The occurrence of Piptocephalis in soils and its isolation

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In an experiment in which dried and ground exo-skeletons of shrimps (abbreviated as GSS) were used as a soil amendment, a luxuriant growth of Mucorineae became evident on the soil surface about 1 week after the application had been made. One or two days later an explosive development of an unidentified fungus belonging to the genus *Piptocephalis* occurred. Two of the isolates have been identified by the "Centraalbureau voor Schimmelcultures" at Baarn as *P. cylindrospora* Bainier parasitizing *Mortierella* species. Since the fungi observed were not present in the shrimp skeletons, it was conluded that they had been present in the soil and that their sudden development was stimulated by the amendment.

Fungi of the genus *Piptocephalis* are all obligate parasites on other moulds, in particular on members of the Mucorales (Benjamin, 1959). In literature little can be found about the occurrence of these parasites in agricultural soils. Dobbs and English (1954) state that *P. xenophila* is not merely a mycological curiosity but that it is probably widely distributed in the soil. Possible reasons why species of the genus *Piptocephalis* have received little attention, might be the following. In soil mycology colonies growing out from plated soil particles are soon transferred to a fresh medium and an attempt is made to isolate one fungus at a time, hence the chance that a host of *Piptocephalis* is transferred together with the parasite is negligible. Furthermore, according to Berry (1959) and Shigo et al. (1961) the composition of the medium – in particular the source of nitrogen – affects the internal composition of the host mycelium, determining its susceptibility. It is therefore possible that the nutrient media used in soil mycology do not provide host fungi with compounds that permit *Piptocephalis* to develop.

It appeared that ground exo-skeletons of shrimps, which are made up of chitin, calcium carbonate and proteins, are a very good medium for the growth of host fungi of *Piptocephalis* and perhaps also for their required disposition to act as such.

To get more information on the occurrence of *Piptocephalis* species in various soils, sea clay and river clay from different fields, and a humous sandy soil were amended with GSS. With an adequate amount of GSS (0.75 g per 100 g of soil) Phycomycetes developed luxuriantly. Usually they belonged to the genera *Mucor*, *Rhizopus* and *Mortierella*, occasionally to *Coemansia* and some unidentified genera. It appeared that *Piptocephalis* was present in eleven out of twenty fields of sea-clay soil and in one

Fig. 1. Haustorium of *Piptocephalis* sp. in a hypha of *Rhizopus nigricans* (photo: Ir. R. E. Labruyère)

Fig. 1. Haustorium van Piptocephalis sp. in een hyfe van Rhizopus nigricans (foto: Ir. R. E. Labruyère)

out of three fields of river-clay soil. The parasite was not found in the sample of sandy soil. Thus *Piptocephalis* is fairly common in clay soils in The Netherlands; we found it in arable land, in pastures, and in virgin soil.

We also tried to find out if the development of *Piptocephalis* and its host fungi is stimulated by organic compounds other than GSS. The materials tried were gluten, glutamin, chitin and keratin, of which 0.5 g was added to 100 g of clay soil. Only chitin strongly stimulated the development of Phycomycetes and *Piptocephalis* species; gluten had this effect only to a small extent.

In one experiment GSS was added to water agar with 0.01 % aureomycin, in order to try this as a medium for isolating *Piptocephalis* spp. from soil. For this experiment the dilution plate method was used. The developing colonies were transferred to potato dextrose agar. Using this method a *Piptocephalis* species was found, parasitizing *Rhizopus nigricans* Ehrenb. (Fig. 1).

The above supports the view expressed by Dobbs and English, that *Piptocephalis* spp. (in their case *P. xenophila)* are widely distributed in the soil. The role of these fungi in soil ecology is, however, as yet obscure. Since they do not seem to injure their hosts they may prove to be of little importance.

Samenvatting

Piptocephalis species, voorkomen in grond en isolatie

Piptocephalis species, onder andere *P. cylindrospora* Bainier, komen in Nederlandse kleigronden algemeen voor. Zij zijn zonder meer van het grondoppervlak af te enten na toevoeging aan grond van fijngemalen garnalenpantsers en zijn te isoleren door het uitplaten van grondverdunningen in wateragar met garnalenpantserpoeder.

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