

# Identification and efficacy of naturally occurring fungi associated with cereal cyst nematode *Heterodera filipjevi* and wheat

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Cereal cyst nematodes (CCNs, *Heterodera avenae* group) are a group of plant parasitic nematodes, which comprise about 12 species, occurring worldwide. Within this group *H. avenae*, *H. filipjevi* and *H. latipons* are the most damaging species causing significant yield losses and economic damage. Despite the application of several management strategies such as the use of resistant cultivars and cultural methods (e.g. crop rotation) yield losses still persist. Therefore, it is important to integrate biological control method with the aforementioned approaches to reduce the damage of nematodes more effectively.

Preliminary outcomes of a field trial in experimental fields of CIMMYT in Turkey revealed a strong reduction of CCN populations suggesting soil suppressive activities. It was hypothesized that these were caused by nematode-antagonistic fungi or bacteria. Therefore, the present study is pursuing the following aims: i) isolation and identification of naturally occurring fungi associated with *H. filipjevi* (cysts and eggs) and wheat; ii) evaluation of antagonistic effects of the isolates on *H. filipjevi* iii) investigation of the modes of action of fungal isolates towards *H. filipjevi*.

To achieve the above mentioned goals *in vivo* screening of a total of 100 fungi

isolated from either cyst or wheat root samples was carried out to evaluate their biocontrol potential against *H. filipjevi*. Of these, ten isolates showed promising results to be used in detailed studies. All fungal isolates were then molecularly identified. The 10 isolates obtained from the *in vivo* study were identified as *Pochonia chlamydosporia*, *Acremonium persicinum*, *Paecilomyces fumosoroseus* and *Fusarium acuminatum*. The first three belong to the Clavicipiteles and are known as nematode parasites. In addition to the *in vivo* tested isolates molecular analyses of nearly fifty additional fungal isolates of field-collected cyst samples indicated a variety of fungal species belonging to the genera of *Embellisia*, *Ophiosphaerella*, *Periconia*, and *Ilyonectria* spp. Also, while some of these fungi have previously been reported as plant endophytes, they have here been isolated from eggs and cysts of *H. filipjevi* for the first time. This newly found association might be exploited for the biological control of the nematode in future.