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Clover rot (*Sclerotinia trifoliorum*) and *Fusarium* fungi in organic red clover in Finland

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Sclerotinia trifoliorum is economically one of the most important pathogens of red clover in Europe and North America, while many *Fusarium* species can cause root rot in red clover in certain environmental conditions. During the years 2003-2004 *S. trifoliorum* was found only in the Northern and Eastern part of Finland, although in 1960's (Ylimäki, 1969) it was common everywhere in Finland. This is probably due to the decrease of red clover cultivation in western and southern parts of Finland. *Fusarium* fungi can live saprophytic or in other plant hosts, when red clover is not available. So, they are not as dependent on clover plants and clover rot. The most aggressive *S. trifoliorum* strains were found in Northern Finland. The cultivars Betty and Bjursele were more resistant than cultivars Jokioinen and Ilte. It was possible to slow down the development of red clover rot in red clover by using microbe preparates and chemical control. The best protectional action had the chemical preparate Rovral (biological effectiveness 65 %) and biopreparate Alirin B containing *Bacillus subtilis* (biological effectiveness 52 %). Also the biopreparate Mycostop slightly slowed down the killing of red clover by *S. trifoliorum*.
There were differences in the composition of fungal isolates in the root samples from young red clover during the first growing season as compared to those of older red clover. *Gliocladium* and *Trichoderma sp.* and *Rhizocotonia* sp. isolates were more common in older organic red clover fields than in the young ones. In the young red clover fields *Cylindrocarpon sp*. isolates were more common than in the older fields. In the nonorganic fields with a long history of cereal growing *Fusarium avenaceum* and *F. culmorum* were more common than in organic fields. These fungal species were also among the most common ones in the previous study of Ylimäki et al. (1967). Only one of the tested 14 *Fusarium* isolates was clearly pathogenic to germinated red clover seedlings. The identification of some of the difficult *Fusarium* and *Sclerotinia* isolates could be confirmed by comparing their ITS (internal transcribed spacer region between ribosomal DNA units) sequences to known sequences in GenBank, while the success of artificial inoculation could be confirmed by comparing the fingerprinting patterns of RAPD-PCR products from the fungus from diseased seedlings to those from the isolate used for artificial inoculation.

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