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Virus vector management

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Overview of vectors of cereal viruses in Finland

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Barley yellow dwarf virus (BYDV), Oat sterile dwarf virus (OSDV) and Wheat dwarf virus (WDV) are the most serious virus diseases of cereals in Finland. BYDV is transmitted by aphids, mainly by bird cherry oat aphid, *Rhopalosiphum padi*. OSDV and WDV are leafhopper transmitted viruses. *Javesella pellucida* (Delphacidae) is a principal vector of OSDV whereas WDV is transmitted only by *Psammotettix alienus* (Cicadellidae).

In Finland, viruses of cereals generally cause occasional problems but not regularly severe infestations. Epidemics of BYDV have clearly been connected with outbreaks of *R. padi*. Generally, outbreaks of aphids appear periodically, every 3-7 years. In Finland, the most severe outbreak of *R. padi* was in 1988. BYDV problems occur in the whole cropping area of spring cereals, mainly in oats and barley. OSDV caused severe damages in oats fields in the western coastal area of Finland in the 1950's. The problem was reduced remarkably by avoiding oat crops as cover crops for undersown ley. Recently, a few sporadic cases of OSDV have been detected. WDV was first reported in Finland as recently as 2004 although similar symptoms were occasionally detected earlier. In 2004, WDV were detected in many winter wheat fields in the southern and south-western coastal area of Finland. In 2005 and 2006, there were only a few WDV cases but in 2007 more infected fields were found.

Alterations in cultivation practices and climate change may affect risk of cereal viruses. Direct drilling and no-tillage, which have become very popular in Finland, may increase the survival of virus vectors (e.g. *J. pellucida*) and change the epidemiology of virus diseases. Weather conditions directly affect both the population biology of vectors and the growth of host plants. The synchrony of insect phenology with susceptible growth stage of host plant is important for virus epidemiology and spreading. Naturally, the sources of viruses, e.g. perennial grasses and winter cereals where viruses can survive and overwinter, are also important.

Because virus problems are occasional but may cause locally severe damages, long-term and short-term forecasting and warning systems are important. Furthermore, effective control methods are needed. In any case, monitoring virus vector species is

the basis of decision-making. In Finland, the forecast of *R. padi* is based on egg count on winter host *Prunus padus*. However, long term migration of aphids by southern winds is also possible. Numbers of spring and autumn migrating aphids are monitored with three suction traps in Finland. Furthermore, numbers of *R. padi* attacking cereal crops are observed with yellow sticky traps. Since 2005 more attention has been paid to monitoring of leafhoppers especially virus vector species, and they have been sampled with yellow sticky traps and sweep nets. Furthermore, leafhopper material will be collected with sweep nets in connection with weed surveys of spring cereal fields (2007-2009). Overview of monitoring results is presented.