

ABSTRACT

Lupins are characterized by unique properties - they absorb atmospheric nitrogen and produce high-protein yield on poor soils, but their acreage has declined significantly in recent years. The main cause is lupine anthracnose, resulting in serious yield losses. For this reason, research was undertaken to improve the resistance of lupins to this disease.

The genetic variability of *Colletotrichum spp.* isolates was characterized using ribosomal DNA analysis and RAPD markers. Both techniques showed differences between *Colletotrichum* species and within *C. lupini*. ITS sequences showed differences between the species: *C. lupini*, *C. acutatum* and *Glomerella cingulata*.

Greenhouse tests have shown that under controlled conditions it is possible to force cross-infection between lupin species (*L. albus*, *L. angustifolius*, *L. luteus*) and *Colletotrichum spp.* isolates of various origin, which, however, does not prove lack of species specificity. Differences in the virulence of the isolates were found, which may indicate partial specificity of the tested isolates. The physiological race VCG2 has been shown to have a higher level of virulence than VCG1. Narrow leaved lupin under controlled conditions was on average more severely infected than yellow and white lupin, which indicates a generally lower level of genetic resistance.

Available collection materials of white, andean, narrow leafed and yellow lupins were examined. All andean lupin accessions were found to be highly susceptible to anthracnose. In white and yellow lupins, the existence of variability in terms of resistance to anthracnose was found and the best accessions suitable for use in resistance breeding were selected. Differences in resistance were found in narrow leaved lupin, however, effective selection of the best accessions would require additional greenhouse tests and modified field tests.

The analysis of weather conditions showed that the development of anthracnose epidemic depends mainly on two factors: rainfall and air temperature. The influence of temperature as a factor with less variability is often invisible. Rainfall increases the risk of anthracnose the most, if it occurs in May with a total of more than 50 mm.

In yellow lupin, resistance was introduced to cultivated forms. Successful selection was possible thanks to a comprehensive evaluation of plant materials using field and controlled greenhouse tests. Tests under controlled conditions confirmed the resistance of selections in the field and showed a gradual increase in the level of resistance in subsequent years. Resistance/tolerance at a level acceptable in cultivation was obtained. The best selections made it possible to breed cultivars registered by COBORU in following years, for example cv. Goldeneye and Diamant.