

Research Work Title

## Introduction to Spruce Populations Tolerant to Surface Powdery Mildew



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### Abstract

Sainfoin (*Onobrychis sativa*) is an important fodder crop with good quality for livestock feeding. It is cultivated in both irrigation and dryland farming conditions. However, sainfoin powdery mildew disease, caused by the *Leveillula Taurica* fungus, can result in necrosis on the plant's leaf tissues and symptom spots. This severe condition can cause a decrease in plant growth, reduced size of the inflorescence, and a lower yield of forage. The most damage occurs during the second and third harvests. To breed improved sainfoin varieties tolerant to powdery mildew, a 12-year evaluation and selection process was carried out in three stages. This resulted in the release of two sainfoin varieties. Experiment 1 involved assessing powdery mildew resistance in 60 populations of sainfoin in response to powdery mildew. Out of these 60 populations, 19 were selected for both forage yield and powdery mildew tolerance or semi-tolerance. Experiment 2 involved assessing and seed production in some tolerant populations of sainfoin to powdery mildew. To identify tolerated and semi-tolerated populations for powdery mildew and their seed production, the seeds of 19 populations were sown in four research farms. All populations were evaluated for disease severity index (DSI) in natural conditions. Two populations, 3001 and 15353, were identified as tolerant populations in all four locations with DSI values of 12% and 23%, respectively. Seed propagation was made for both tolerant populations in an isolation farm. Experiment 3 involved sowing the seeds of two populations of 3001 and 15353 along with the native population susceptible to powdery mildew as a control in 10 farms. Data was collected for plant height and forage yield in three harvests in two years. The DSI of the two populations of 3001 and 15353 and the control was evaluated in the third harvest in both years. The two populations of 3001 and 15353 with DSI values lower than 10% coupled with higher yield were considered as tolerant to powdery mildew disease than to the native population with a DSI of higher than 50% in all locations. The quality of selected populations for crude protein and dry matter digestibility was assessed. Both varieties had higher quality than the local populations. Finally, the two populations were introduced as new cultivars for cultivation in both irrigation and dryland farming systems.

