Germplasm survey and collection of *Festuca sinensis* accessions associated with the endophyte *Epichloë sinensis*

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Festuca sinensis, a native grass in China, is a high-quality forage species in the Qinghai-Tibet Plateau and plays an increasingly important role in restoring degraded grasslands and improving the ecological environment. *Epichloë* endophytes form a mutualistic symbiosis with *F. sinensis*, which can be utilised in germplasm innovation and breeding. In order to breed new cultivars with associated beneficial endophytes, our group investigated their distribution in the Qinghai-Tibet Plateau. *F. sinensis* germplasm was collected across 356 sites, including 46 counties/districts in Qinghai Province, Gansu Province, Sichuan Province, and Xizang Autonomous Region, which suggested that *F. sinensis* was widely distributed in the Qinghai-Tibet Plateau. During the investigation process, we noticed that *F. sinensis* normally grew in moist and shady areas, along streams, under forested areas and/or at the edges of farmland at altitudes ranging from 2,300 m to 4,700 m. It is normally a companion species of other grasses including *Elymus nutans* and *Poa annua* in natural grasslands. *F. sinensis* plants completed their growth stages and produced mature seeds between August 20th to September 30th, depending on their location. *F. sinensis* was scattered in the community with a height range of 30 cm to 80 cm, and a tiller number range of 1 to 4 in most survey sites. The frequency of endophyte within *F. sinensis* populations was also investigated by assessing seed. One hundred and sixty-six lines from 173 lines were infected by endophyte, with an infection frequency between 10% to 100%. The infection frequency of 122 lines was above 80%. This research clarified that the vast majority of *F. sinensis* on the Qinghai-Tibet Plateau was infected by endophyte and had a high infection frequency (>80%). Based on these collected resources, the first germplasm resource nursery of *F. sinensis* can be established to meet diverse breeding needs.

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