



Populations of *Medicago Falcata* L. in Small River Basins of Russia as a Source Material for Breeding

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Abstract. The genetic resources of wild populations of *Medicago falcata* L. of the Cretaceous South of the Srednerussky Upland in ecotopic conditions of chalky slopes and floodplain meadows in the basins of small rivers Tikhaya Sosna and Manjokha were studied to find the source material for breeding work to create varieties for different cultivation conditions. Evaluation of phytocenotic features, density of cenopopulations, forage and seed species was carried out. The species *M. falcata* forms, both on meadows in floodplains and on chalk slopes, full-membered normal cenopopulations, which have a continual (continuous) distribution of individuals by age groups, stable in time and in space. The centralized ontogenetic spectrum indicates the stable status of *M. falcata* cenopopulations in plant communities in various ecotopes of small river basins. The density of individuals of *M. falcata* was on average 18.9 % higher in cenopopulations of floodplains than in chalk slopes. The density of generative individuals in all studied cenopopulations was on average close and varied within 81.2-83.7 %, which indicates their stability in time and high adaptive potential. The weight of one fruiting model plant of floodplain meadows was 2.28 times higher than on chalky slopes. Seed yield on floodplain meadows was 2.02 times higher than on chalky slopes. Valuable source material for breeding *M. falcata* varieties adapted to different ecotopic conditions was obtained.

Keywords: genetic resources, seed productivity, aboveground productivity, ontogenetic spectrum, age structure of cenopopulations.

In the Cretaceous south of the Middle Russian uplands, scientists of Belgorod State University are searching for the original forms of valuable crops, including *M. falcata*, within the framework of joint research programs with the leading federal research centers of the Russian Academy of Sciences: Williams Reserch Center for Forage Production and Agroecology and All-Russian Research Institute of Phytopathology [1-5].

The aim of the research was to study the genetic resources of wild populations of *M. falcata* from the Cretaceous south of the Central Russian Upland in the slope and floodplain types of terrain in small river basins to find the source material for breeding work to create varieties for different cultivation conditions. Studies in 2018-2020 were conducted in the basins of small rivers flowing through the territory of Belgorod region. Researchers from federal research centers of the Russian Academy of Sciences: Williams Reserch Center for Forage Production and Agroecology, All-Russian Research Institute of Phytopathology participated in the studies as part of joint research programs.

The aim of the research was to study the genetic resources of wild populations of *M. falcata* from the Cretaceous south of the Central Russian Upland in the slope and floodplain types of terrain in small river basins to find the source material for breeding work to create varieties for different cultivation conditions. The object of the study is sickle-shaped (yellow) alfalfa (*Medicago falcata* L.), a perennial species whose populations in Belgorod Region grow in a variety of ecotopes: on roadsides, in fallow lands, on steppe plots, on slopes, on edges, along pond banks, in agricultural crops.

Conclusion

1. It was established that the number of individuals (density) of *M. falcata* was on average 18.9 % higher in cenopopulations growing in floodplains than on chalk slopes. The density of generative individuals on the average for all studied cenopopulations was close and varied within the range 81.2-83.7 %. The predominance of generative individuals in cenopopulations indicates their stability in time and high adaptive potential.

2. Evaluation of model plants showed that, on average, the weight of one fruiting plant growing in more favorable conditions of moisture in floodplain meadows was 2.28 times higher than that of plants growing on chalky slopes. Seed yield of plants on floodplain meadows was 2.02 times higher than seed yield of plants growing on chalky slopes.

3. The assessment of age states has shown that the species *M. falcata* forms, both in meadows in floodplains and on chalk slopes, full-member normal cenopopulations, which have a continuous (continuous) distribution of individuals by age groups, stable in time and in space. The centered ontogenetic spectrum indicates the stable status of *M. falcata* cenopopulations in plant communities in various ecotopes of small river basins.

4. Valuable source material for selection of *M. falcata* varieties adapted to different ecotopic conditions has been obtained. Forms adapted to favorable conditions of sufficient moisture have been obtained from cenopopulations of floodplain meadows. From the cenopopulations growing on chalk slopes in unfavorable conditions of limited water resources, the forms able to withstand the conditions of scarce moisture of steppe and arid areas have been selected.

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