INTERSPECIFIC HYBRIDS BETWEEN ALFALFA, Medicago sativa L., AND M. dzhawakhetica Bordz

IN 1951 a single tetraploid (2n=32) seedling was obtained from a mixed population of Medicago dzhawakhetica kindly supplied by R. A. Brink of the University of Wisconsin (Wisc. accession Nos. 23 and 172). Treatment of part of this population by colchicine may have been responsible for this tetraploid seedling as M. dzhawakhetica is reported to be a diploid (2n=16) species.

Crosses of this tetraploid with wild-growing diploid (2n=16) and cultivated tetraploid lines of M. sativa were attempted. One triploid (2n=24) plant, which did not reach the flowering stage, was obtained from 135 pollinated flowers in the cross: diploid M. sativa X tetraploid M. dzhawakhetica. This hybrid has been reported in a previous paper. In the cross tetraploid M. dzhawakhetica X tetraploid M. sativa two plump seeds were obtained from 286 pollinations; 264 reciprocal pollinations were unsuccessful. Only one of the two seedlings reached the flowering stage and most of the subsequent study was carried out with this plant.

Several observations established the hybrid nature of the plant. The most conclusive was its greenish flower color indicating that color components of both M. dzhawakhetica (yellow) and M. sativa (purple) were present. A conspicuous feature was chlorophyll-deficiency of its foliage similar to that described by Smith in interspecific hybrids in Melilotus. This growth habit was prostrate but more profuse than M. dzhawakhetica. The pod hairs, though articulate in M. dzhawakhetica, were distinctly shorter. The hybrid showed physiological weakness in that only 1% of its cuttings rooted while 80% of the parent plant cuttings rooted.

A characteristic, resembling M. dzhawakhetica, was the hybrid's requirement of winter-dormancy in order to flower (field-treatment until mid-February or 10 weeks storage at 1 to 2°C).

The self-fertility of the hybrid was low; only 2 viable seeds were produced from 91 selfed flowers. Its male-fertility, however, was high (83% stainable pollen), and in backcrossing to M. sativa 75 seeds were obtained per 100 pollinations.

Cytological investigations showed that this hybrid was a hexaploid (2n=48). It is presumed that 32 of its chromosomes had come from M. dzhawakhetica as indicated by its closer resemblance to M. dzhawakhetica. The backcross progeny with M. sativa, as expected, approximated the pentaploid number, 2n=40, (out of 8 plants 6 were 2n=40, one 2n=38, and one 2n=41).

Both hybrid plants in which chromosome number was

The fact that the uniting of the two species makes the utilization of the hereditary potentials of M. dzhawakhetica in cultivated alfalfa a promising field for the plant breeder.—KARLIS LESINS, Research, Forage Crops, Department of Plant Science, University of Alberta, Edmonton, Canada.

DISTANT RELATIVES OF CULTIVATED ALFALFA, Medicago ruthenica and M. platycarpa

JUDGING from the climatic conditions of the regions in which they naturally occur, Medicago platycarpa (2n=16) and M. ruthenica (2n=16) may carry genes which, if transferred to cultivated alfalfa might increase its productivity and cold resistance. Repeated attempts at the University of Wisconsin in 1949–50, to cross the two species of alfalfa, both diploid (2n=16) and tetraploid (2n=32), with M. sativa (2n=16), and M. rigidula (2n=14), were unsuccessful. Crosses with M. lupulina (2n=16), M. lupulina (2n=16), and M. rigidula (2n=14), were also. Taxonomists disagree concerning the genus to which M. platycarpa and M. ruthenica belong. Originally they were described as species of Trigonella by Ledebour (Flora Rossica), and recently Komarov, (Flora U.R.S.S.), returned them to Medicago.

The flowers, pods, and seeds of M. ruthenica, smaller, are identical in form to those of M. platycarpa. The flowers of both species are yellow; however, the flowers of M. ruthenica used in this investigation had petals which were deeply tinted with maroon. This strain also had much finer stems and narrower leaves than M. platycarpa.

Medicago ruthenica and M. platycarpa have morphological features in common, which differ from those present in other species of Medicago. The flowers of M. ruthenica and M. platycarpa (figure 1) have petals which are nearly as large as the standard, and smaller wing petals in the other species; wing petals extend perpendicularly and laterally from the keel, in contrast to those extending parallel to the keel. The petal which extends perpendicularly and upward is the

1 Paper number 620 from the Department of Genetics, Wisconsin Agr. Exp. Sta., Madison. Published with the approval of the Director. Received July 28, 1956.