STUDIES on the inheritance of certain characters in alfalfa were begun at the Rhode Island Agricultural Experiment Station in 1929. The chief purpose in mind was the obtaining of strains of alfalfa that would be more suitable to local conditions than those now available. On our naturally acid soils, alfalfa is usually short-lived and often difficult to get established. This is especially so when it is attempted to grow it in pure culture. When grown in mixture with grasses and clovers, it seems to thrive much better. If a strain could be produced that would be better adapted to our soil and climatic conditions, alfalfa would no doubt assume a place of more importance on Rhode Island dairy farms. So far, most of the breeding work with alfalfa has been done in the midwestern states where the crop is better adapted than it is in the eastern United States and where the problems of growing the crop are considerably different.

Selections have been made from a number of varieties and strains of alfalfa. These selections have been selfed for the purpose of obtaining pure breeding material to be used in crossing as well as for the study of the influence of selfing. Selections have been made from Grimm, Canadian Variegated, Hardigan, Ladak, Hansen, Cossack, and a number of yellow-flowered falcata alfalfa types. After several generations of selfing, crosses have been made between promising lines in an attempt to combine desirable characteristics in one progeny.

Selfing usually results in reduced vigor in alfalfa. The amount of reduction in vigor has varied a great deal among the different lines. Some lines lost vigor very rapidly and were eliminated after one or two years of selfing. A few lines have apparently maintained their vigor even after three and four generations of selfing.

In connection with studies on winterhardiness, yield of forage, and seed production of these various lines, a study was made also on the inheritance of flower colors. Although the limited amount of material and more or less secondary consideration of this character make definite conclusions impossible, a number of facts have been found that are thought to be worth presenting at this time. Crosses have been made between inbred strains with blue, yellow, and white flowers. The blue- and white-flowered types were of the sativa group while the yellow were of the falcata.

REVIEW OF LITERATURE

Fryer (2) reports that the haploid number of chromosomes in both M. sativa and M. falcata is 16. This is an indication that crosses between the species are relatively easy to make and are for the most part fertile.