GENETICISTS have begun to consider genetic studies with diploid alfalfa as a tool for analyzing some of the complex inheritance patterns found in tetraploid alfalfa. Three flower color inheritance studies (3, 6) and a study on the inheritance of ovule number (1) have illustrated the potential value of studying characters controlled by two or more genes on the diploid level rather than the tetraploid level. Even though genetic hypotheses suggested by diploid studies cannot be affirmed by tetraploid plants without progeny testing, available evidence supports the hypothesis that genetic studies of a character in diploid *Medicago* saliva L. or *M. falcata* L. will indicate the probable mode of inheritance for that character in tetraploid alfalfa. Cytological studies by Cleveland and Stanford (4) indicated that gross chromosome homology was similar for tetraploid *M. sativa* and diploid *M. falcata*. Sprague (5) found similarities in chromosome homology as well as similarities in cross and self fertility relationships between diploid *M. sativa* and *M. falcata*.

This paper reports the inheritance of two qualitative characters in advanced-generation hybrids between diploid *M. sativa* and *M. falcata*. Both are mature plant characters, one dealing with floral-bud-color and the other with floral-vein color.

**MATERIALS AND METHODS**

Genetic studies were based on crosses among 1 white-flowered and 7 yellow-flowered diploid alfalfa plants. Plants 1–14, 1–71, 1–82, and 1–93 were *F*₂ progenies from several crosses between diploid (2n = 16) *M. sativa* and diploid (2n = 16) *M. falcata*. The *M. sativa* parentage traced to the plant introduction described by Bolton and Greenshields (2). Plants 1–69, 1–97, 1–98, and 1–100 were diploid *M. falcata*.

Bud-color data were obtained from *F₁*, *F₂*, and *BC₃* plants grown simultaneously in the field during the summer of 1962. Vein-color data were obtained from both greenhouse and field grown plants.