Alfalfa (Medicago sativa L.) is a polymorphic species, adapted to many soils and climates. Inherent variation is immense, the introgression of M. falcata L. into M. sativa has increased genetic variation and range of adaptation. Alfalfa is grown extensively in the temperate climates of all continents.

As with all crops, the methods and procedures used in breeding alfalfa depend upon the botanical, physiological, genetic, and reproductive characteristics of the species. Alfalfa, a perennial with perfect flowers, is naturally crosspollinated by bees, tolerates comparatively little inbreeding, and can be vegetatively propagated by stem cuttings. It has a chromosome complement of $X = 8$ with both diploid and tetraploid forms (65). All cultivars are autotetraploids and the inheritance of economic traits is therefore quite complex.

**25–1 BREEDING**

**25–1.1 Constraints and Objectives**

At the initiation of an improvement program, the breeder makes several important decisions that will determine the success or failure of the program. Decisions must be made concerning the traits to be improved, the extent of improvement desired, the parental germplasm, the unit of selection, and the mating system to be used. Additional decisions involve population sizes, selection intensities, selection techniques, field test procedures, and the time frame in which the breeding objectives are