FOR nearly a century alfalfa has been one of the most important hay crops in the western and midwestern regions of the United States. With the advance in knowledge on varietal adaptation and fertility requirements, it has spread eastward. Today alfalfa is grown successfully in areas of the Southeast. The acreage in North Carolina increased from approximately 10,000 in 1945 to 51,000 in 1949 (15, 16). Despite the advancements that have been made in alfalfa production, persistence of stand is still a major problem in this region.

Stand losses in established fields of alfalfa have been reported as being due to several causes. Winter injury, alone and in association with disease, has been reported by several workers (8, 10, 14, 20). Disease damage alone has been reported as follows: Bacterial wilt caused by *Corynebacterium insidiosum* (McCull.) H. L. Jens. (9); Fusarium wilt caused by *Fusarium oxysporum* var. *medicaginis* (Weimer) Snyder and Hanson (19); and root rots caused by *Fusarium solani* (Mart.) Sacc. (18), *Stagonospora meliloti* (11), *Colletotrichum trifolii* Bain and E., *Rhizoctonia solani* Kuehn (17), *Plenodomus meliloti* D. and S. (3), *Cylindrocarpon ehrenbergii* (4), and other root pathogens (5, 6).

Allison (1) has reported that several diseases destructive to alfalfa occur in North Carolina and that environmental conditions favoring the growth of alfalfa also favor the diseases which attack it.

Woodhouse (21) and Bear (2) have shown that fertilization is an important factor in the maintenance of alfalfa stands in the East. Bear has shown that the life of a stand can also be shortened by cutting too early or too frequently during the period following the removal of a hay crop.

The investigations reported herein were undertaken to provide information on the nature of stand depletion and to determine the relative persistence of alfalfa strains in North Carolina, thus laying the groundwork for the breeding of more persistent varieties. Well-drained sites were selected for these studies, and limiting, fertilizer, and cutting practices were followed which would minimize losses from poor drainage, nutritional deficiencies, and injurious cutting practices.

**Experimental Procedure**

Two hundred and forty-four experimental strains of alfalfa undergoing evaluation in the breeding program were used in these studies. All strains were grown on a native sandy loam soil on well-drained sites. Fertilizer and cutting practices were followed which would minimize losses from poor drainage, nutritional deficiencies, and injurious cutting practices.