ONE of the major causes of failure to establish stands of crested wheatgrass [Standard, *Agropyron desertorum* (Fisch.) Schult., and Fairway, *A. cristatum* (L.) Gaertn.] can be attributed to planting seed at too great a depth. Most seedlings do not have sufficient vigor to emerge and become established when the seed is planted more than 1 to 1 1/2 inches deep. The development of varieties with greater seedling vigor should help to reduce this hazard. Not only could seed be planted deeper where moisture conditions are generally more satisfactory for germination but more vigorous seedlings would have a better chance to break through soil crusts that often form at the surface after planting. At shallower depths these seedlings would also be more likely to survive because of more rapid development of both top and root growth. They should more easily overcome the hazards of establishment such as damage from root rots, insect damage, hail, sand blast, weed competition and other growth limiting factors. The development of varieties that can be planted with greater assurance of stands should result in an increase in the acreage planted to crested wheatgrass.

One of the major objectives of the grass breeding program with crested wheatgrass at the U. S. Northern Great Plains Field Station is the development of varieties with increased seedling vigor. The most direct approach has been the selection toward heavy or large seeded types. The results of experiments showing the relationship between seed size and seedling vigor as measured by depth of planting trials are summarized in this paper.

**REVIEW OF LITERATURE**

There is considerable literature in which the relationship of seed size to seedling vigor within various crops is discussed (1, 2, 3, 7, 8, 9). According to the research that has been done, this relationship is close within a crop or species with the large seeds producing the most vigorous seedlings. Between species, data presented by Plummer (9) and Murphy and Arny (8) show that within wide limits those species having the heaviest seed produce the most vigorous seedlings.

A number of workers have reported seedling emergence data for crested wheatgrass planted at depths from 0 to 6 inches. Love and Hanson (5) found in a greenhouse planting, that the maximum depth from which seedlings of Standard appeared above the surface was 3 inches. Emergence from depths of more than three-fourths inch was low. Murphy and Arny (8) obtained an average emergence of 64, 15, and 1% for Standard planted in the greenhouse in several different soils at depths of 1, 2, and 3 inches respectively. In all soils, emergence was much higher at shallower depths. Herman and Herman (2) also got low emergence from seeding depths of more than 1 inch. They found that lighter, less mature seed gave much lower seedling emergence especially at greater depths. In these studies, germination was as good in cases of non-emergence as emergence, but the seedlings failed to emerge because the coleoptiles failed to elongate sufficiently to break the soil surface. McKenzie, Henrichs and Anderson (6) reported emergence of 64, 15, and 1% for Standard in several different soils at depths of 1, 2, and 3 inches respectively.