Preemergence Freezing Injuries of Dubois Winter Oat Seedlings

E. J. Kinbacher

The cold resistance of young seedlings presents a stimulating research problem. Kinbacher (4) reported that the cold resistance of 'Dubois' winter oat (Avena sativa L.) seedlings varied significantly within a 24-hour period. Cold resistance of preemerged seedlings increased markedly the day prior to emergence (4, 5). Arakeri and Schmid (1) reported that plants in the first-leaf stage exhibited a higher degree of cold resistance than pre-emerged seedlings.

Kinbacher (5) also noted that seed source affected the cold resistance of preemerged winter oat seedlings. The length of plumule and primary root, seed size, percentage total nitrogen, and respiration rate did not appear to be associated with the degree of cold resistance of seedlings developing from the different seed sources.

The cold resistance of the pre-emerged oat seedlings increased during the period of most rapid elongation of the first internode, coleoptile, and plumule. The distance of the coleoptile apex from the scutellar node approximately doubled the day prior to emergence. Kiesselbach (3) stated that the first internode of corn, the portion of the stem between the scutellar and coleoptile node, elongates by intercalary growth at its upper end. This contributes to the rise of the coleoptile through the soil. The coleoptile also elongates, the greatest elongation occurring at the basal end. The degree of elongation of the first internode varies with...