

PUBLICATIONS

2002

INFLUENCE OF TEMPERATURE ON SWITCHGRASS EMERGENCE

G. W. Evers and M. J. Parsons

Background. Switchgrass (*Panicum virgatum* L.) is a native warm-season perennial grass that is used for grazing, hay, erosion control, and as a potential biofuel feedstock. As with most native warm-season perennial grasses, obtaining good stands is difficult because of small seed size, slow and erratic germination, and poor seedling vigor. Other factors inhibiting switchgrass establishment are seed dormancy and a seedling morphology causing permanent roots to arise from above the seed and near the soil surface. Therefore young seedlings are very vulnerable to drought. Temperature is a major environmental factor that influences seed germination, seedling emergence, and seedling vigor. A growth chamber study was conducted to determine the effect of temperature on switchgrass emergence to identify optimum planting times. Seed of Alamo and Lowdorm, southern ecotypes, and Blackwell, a northern ecotype, were planted in pots and placed in growth chambers set at day/night temperatures set at 68/50^o, 77/59^o, and 86/68^oF. Seedling emergence was recorded daily for 28 days after planting.

Research Findings. Emergence increased as temperature increased but temperature did not affect total emergence by 28 days after planting (Fig. 1). By 8 days after planting, seedling emergence in the 86/68^oF temperature treatment was near maximum emergence and was twice that of the 77/59^oF treatment. None of the seedlings in the lowest temperature treatment had emerged by this time. The ranking of varieties for emergence rate and total emergence was Lowdorm>Alamo>Blackwell (Fig. 2). Lowdorm switchgrass was selected for reduced seed dormancy and it had a greater and more rapid seedling emergence than the other varieties. Maximum emergence was reached at 16 days after planting for the southern ecotypes Lowdorm and Alamo, and at about 24 DAP for the northern ecotype, Blackwell.

Application. In northeast Texas, temperatures from April through October should be adequate for total switchgrass seedling emergence. However emergence would be more rapid if planted in warmer temperatures from May through September if moisture were not limiting. Long term monthly rainfall for May and June exceeds 4 in. so that May should be the optimum switchgrass planting time in this area. The more rapid emergence should also make the switchgrass seedlings more competitive with weeds. Lowdorm switchgrass should be planted in the southeastern USA because of greater and more rapid emergence.

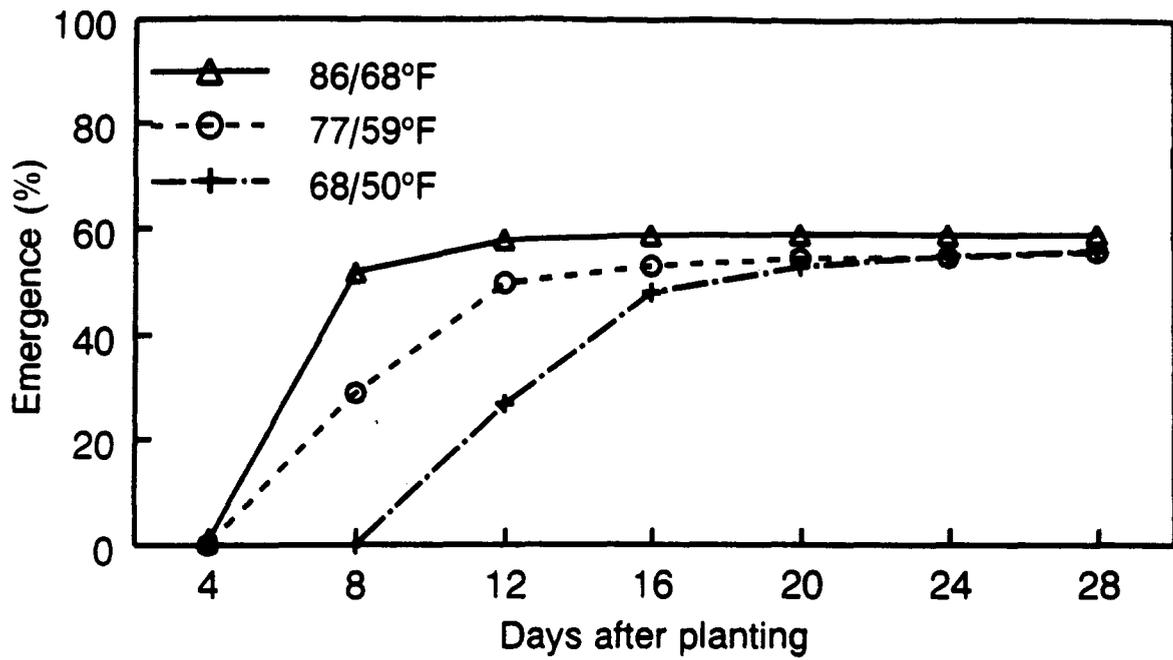


Fig. 1. Effect of day/night temperatures on switchgrass emergence averaged across varieties

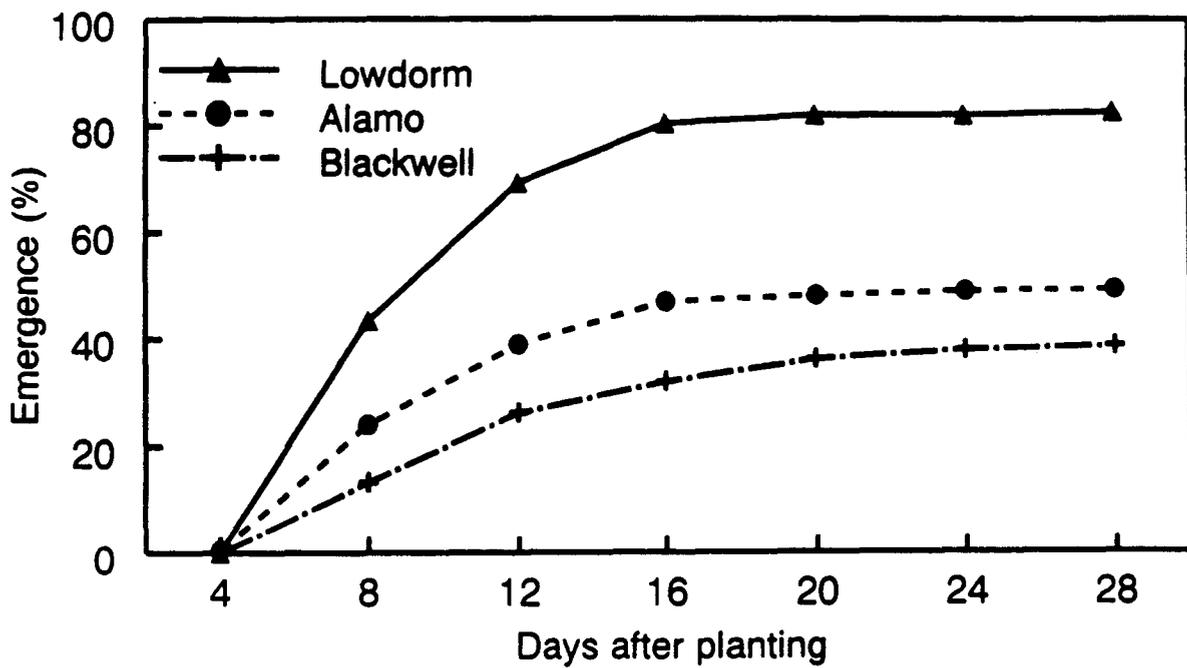


Fig. 2. Emergence of switchgrass varieties averaged across temperatures