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INFLUENCE OF TEMPERATURE ON ANNUAL RYEGRASS SEEDLING GROWTH

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Background. An estimated 800,000 acres of annual ryegrass are grown in the eastern half of Texas each year. Ease of establishment and adaptability to a wide range of soil types are the primary reasons for its wide use. Early forage production is influenced by planting date. In northeast Texas, September plantings must be on a disked seedbed or sod to prevent competition from warm-season grasses and weeds and to obtain better seed placement. Mid-October is recommended for overseeding summer pastures that are mowed or grazed short. October to December ryegrass production is critical because low temperatures limit ryegrass growth in January and February. The effect of temperature on annual ryegrass shoot growth and tiller production was investigated because of their influence on early forage production.

Research Findings. TAM 90 ryegrass seed were planted in Cone-tainers (8 in. long, upper end 1.5 in. I.D.) containing a mixture of sand and peat moss. Cone-tainers were placed in three growth chambers set at day/night temperatures which occur in September (90/60°F), October (77/55°F), and November (64/43°F) in northeast Texas. Seven seedlings were removed from each growth chamber at weekly intervals up to 6 weeks to record shoot weight and tiller number.

Shoot weight increased slowly the first 3 weeks but then exhibited a greater weight increase with each succeeding week (Fig. 1). Plant growth is dependent on the amount of leaf area present to carry on photosynthesis to synthesize carbohydrates for growth. The more leaf area, the greater the growth until a solid leaf canopy develops to intercept all the sunlight. Shoot growth was greatest at the medium temperature and least at the low temperature.

Tiller, or new shoot, production is important in grasses because it is a source of new growth or regrowth after grazing. Initially tiller development was slow but increased rapidly between 2 and 5 weeks after planting (Fig. 2). Tillers per seedling were greatest at the high temperature (September) treatment until the third week. From that point ryegrass seedlings at the medium temperature produced the most tillers. Seedlings growing at the lowest temperature (November) always produced the fewest tillers.

Application. The average maximum and minimum daily temperature during October in northeast Texas resulted in the greatest ryegrass shoot growth and tiller production. Annual ryegrass should be planted in mid-September in a prepared seedbed or lightly disked sod so seedlings will be 2 to 6 weeks old during the favorable October temperatures. Delaying planting until November will result in poor ryegrass growth until March.

Figure 1. Influence of temperature on TAM 90 ryegrass shoot weight (linear power function).

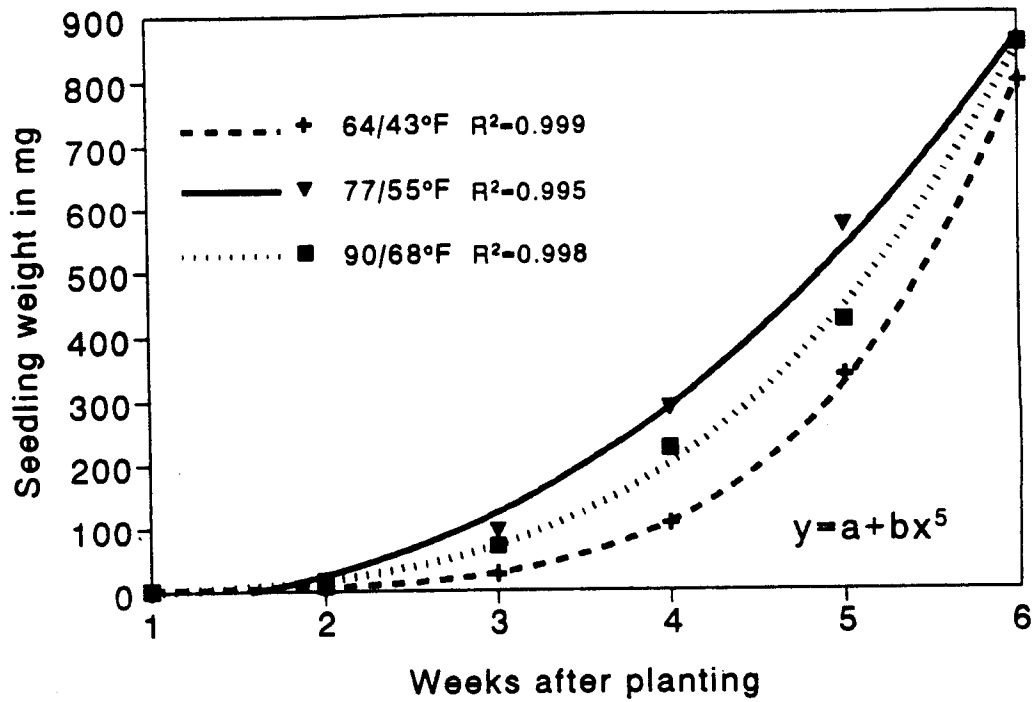


Figure 2. Influence of temperature on TAM 90 ryegrass tiller number (linear exponential function).

