OPTIMUM SOIL pH FOR CLOVER ESTABLISHMENT

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Background. Cool-season annual clovers are an important part of pasture systems for beef production in East Texas. When overseeded on warm-season perennial grasses they provide many economic benefits. Clovers 1) extend the grazing season about 6 weeks; 2) provide a forage with high nutritive value that is higher in protein, calcium, and phosphorus than grasses; 3) incorporate nitrogen from the air into the pasture system through N_2 fixation; and 4) provide some spring weed control through plant competition. The downside to clovers is that they are more soil specific, require more management, and are more sensitive to soil pH and nutrient deficiencies than grasses. Failing to determine soil pH and make necessary adjustments with lime before planting are major reasons for poor clover performance. Field observations also suggest that clover species vary in their adaptability to soil pH.

A greenhouse study was conducted at the Texas A&M University Agricultural Research and Extension Center at Overton to determine the influence of soil pH on cool-season annual clover seedling growth. A Lilbert loamy fine sand was amended with sulfur or lime to improve soil's pH ranging from 4.3 to 8.0. Yuchi arrowleaf, Bigbee berseem, Dixie crimson, Overton R18 rose, Mt. Barker subterranean, and Abon Persian clovers were seeded in 6 in. pots containing soil of the different pH levels.

Research Findings. There was a linear, or straight line relationship, between soil pH and shoot weight for crimson, subterranean, and berseen clovers (Fig. 1.). Soil pH had the least effect on crimson and subterranean clovers but there was a small but steady increase in shoot weight as pH increased. Shoot weight of berseem clover also increased as soil pH increased but at a faster rate than crimson and subterranean clovers. Arrowleaf and rose clovers grow best at a soil pH of about 6 to 6.5 with lower shoot weights as the pH increased and decreased. Persian clover grew best at a pH of 7 to 8 with shoot weight decreasing rapidly as pH decreased.

Application. A soil analysis should be done before planting any clover. Lime should be applied if soil pH is below 6 for good clover seedling growth and availability of soil nutrients. Berseem and Persian clovers do best on soils with a pH of 7 to 8 and arrowleaf and rose clovers at a pH of 6 to 6.5. Crimson and subterranean clovers grew well on all soil pHs above 6.

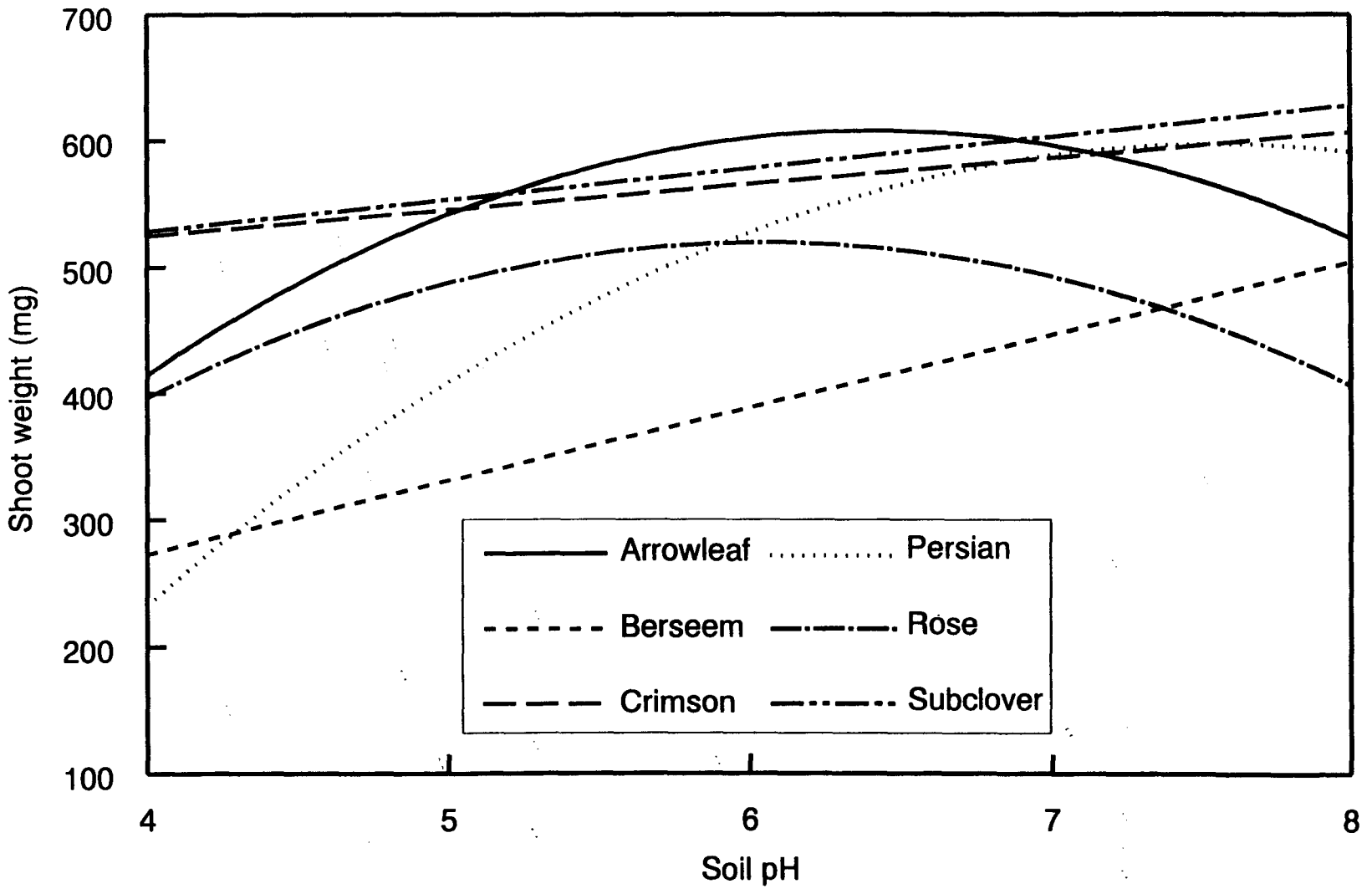

Fig. 1. Influence of soil pH on seedling growth of six cool-season annual clovers.