Preliminary Trials with Intercropping of Corn and Clover

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FROM present knowledge of soil chemistry it appears that within rather wide limits the competition in the soil between companion crops should be primarily for nitrogen, water, and possibly oxygen. Nitrate and water are mobile and can be almost entirely removed from a soil area by a relatively low plant population. In comparison, adsorbed nutrients, e. g., calcium, potassium, and phosphate ions, move very little in the soil and are taken up by plants only in areas immediately adjacent to their roots. Under these conditions the only competition for inmobile ions would be in the areas where roots immediately overlap and contact the same clay particles. In fertile soils and with normal spacing the proportion of the total amounts of available forms of these inmobile nutrients which are removed by the plants is small.

This paper reports a preliminary attempt to determine the extent to which the addition of two mobile nutrients, nitrate and water, can eliminate the competition between corn and clover or other companion crops when grown in association on fertile soil. In pasture studies grasses are frequently found to be benefitted by legume association, and although corn is apparently not benefitted by a companion legume, such a system has advantages which warrant its study.

In this experiment second year red clover and sweetclover were turned under only in narrow strips where corn rows were to be placed and the clover between the rows was clipped close to the ground when the corn was planted. The sweetclover was killed by this clipping and remained as a mulch on the unplowed strips between the rows. A modification with oats as the intercrop was also included. In the red clover areas the clover grew tall enough to necessitate clipping a month and again 6 weeks after the corn was planted. All plots under this corn-clover association were paired with adjacent plots which were spaded and cultivated to simulate the conventional seedbed preparation and management.

In 1945 all plots were divided and sweetclover and clovers were sowed in the oats in the two respective halves of each plot. By the spring of 1946 excellent stands of clovers were growing on all plots. Since the previous rotation study had been carried out with duplicate members of these duplicates had received identical as well as management and treatment for seven years, the present experiment these duplicates were compared with one being put into the slit-cropping system and the other into the conventional system.

During the first few days of April, plots under conventional system were spaded by hand to simulate (Fig. 1). On plots under the slit-cropping system, inches wide were spaded at the same time and the plots on the 26-inch space between these 'spaded strips' were disturbed (Fig. 2).

On May 15 the spaded areas were evened with a rake and corn was drilled by hand in 39-inch rows at a rate of 15 stalks per rod (12,000 stalks per acre) for the conventional (Fig. 4) and slit-cropped plots. The corn cross, WF9 X Hy, was used. The clover between rows in the slit-cropped system was closely clipped and remained on the surface as a mulch (Fig. 5). The clover was killed by this clipping, but the red clover rapidly and was clipped again when it seriously shaded the corn. The appearance of a plot under the conventional and of a plot under the slit system at this period is shown in Figs. 7 and 8, respectively.

When the corn was mature the entire plots were weighed in the field, the corn ears were shelled, and yields of grain were calculated on the basis of No. 2 corn.

FIG. 1.—Plot under conventional system at plowing April 1.