

## Carolina Clover and the Low Hop Clovers as Southern Fairway Plants

By A. J. Pieters

These little clovers need to be discussed together, as they occupy the same place among the plants on a fairway, flourish at the same time of year in the South, and when not in bloom are not readily distinguishable one from another, at least by the casual observer. The Augusta (Georgia) Country Club, on whose course these clovers have existed for several years, recently reported that "some time in January the clover appears and fills all cups and bare spots perfectly and also gives a greenish appearance to the entire course."

The Carolina clover (*Trifolium carolinianum*) (Fig. 1, left) is one of the four native North American clovers found east of the Mis-



Fig. 1.—Carolina clover (left) and low hop clover (right). The upright habit of Carolina clover is well shown, but low hop clover is naturally prostrate. Least hop clover resembles low hop clover, but the flowerheads are smaller

issippi River, and, as regards abundance, is by far the most important of the four. Its chief range is from North Carolina through the Gulf states to Arkansas and Texas, though it is occasionally found in Virginia and has been collected at the navy yard in Philadelphia. In this last case it was probably introduced.

The two hop clovers, so named from the resemblance of their flowerheads to the flowerheads of the hop plant, are the low hop clover (*Trifolium procumbens*) (Fig. 1, right), and the least hop

clover (*Trifolium dubium*). They range over practically the entire United States, except in the semi-arid region, and were both introduced from Europe. It is not known just when these hop clovers first came to America, but in a letter written to Arthur Young, of England, in 1786, George Washington asked him to ship 50 pounds of hop clover seed to his Virginia estate. From this source the plant probably spread south and west. The territory in which the hop clovers are most important coincides pretty well with that in which the Carolina clover is common, and frequently all three plants are found in the same field. In the North, the hop clovers are found in practically every state, but there are seldom more than a few plants in a locality. At present both hop clovers are abundant on the piedmont soils of western South Carolina and northern Georgia, and are common on all the better soils from Alabama to Arkansas, though they do not compete with the Carolina clover in the southern parts of these states.

It may be of interest to mention here that the least hop clover, which in England is called suckling clover or *Trifolium minus*, is said to be the true shamrock. Thousands of plants of white clover are sold every year as shamrock; but there is excellent authority for the statement that not the white clover, but the least hop clover, is the plant most commonly called shamrock by the Irish.

The Carolina clover varies a great deal in size of plant and in habit of growth. Commonly, few to many main branches arise from a stem so short that the branches are decumbent at first and then turn up so that at flowering time the branches are erect or nearly so (Fig. 1, left). The heads of pale cream or whitish flowers are borne on rather long stalks which terminate every main or lateral branch. The leaves, as in all clovers, are three-parted, and in the Carolina clover all divisions of the leaf arise from the same point on the end of the leafstalk or petiole (Fig. 2, left). This character distinguishes the Carolina clover from the hop clovers, with which it might otherwise be confused in the early stages of growth when none of them are in flower. In both hop clovers the middle section of the leaf is borne on a distinct stalk of its own (Fig. 2, right). This stalk is about one-third as long as the leaflet. Curiously enough, this character does not appear at first. On very young plants of hop clover the middle leaflet is without a stalk, but as the plant grows older the stalk appears and thereafter is present in every leaf.

In all of these clovers, each leaflet is wedge-shaped at the base, and broad at the apex, which is frequently notched. The margin of each leaflet is toothed except along the wedge-shaped base. The leaflets of Carolina clover are hairy. In the Carolina clover the leaf-veins are quite prominent and nearly always branch, while in the hop clovers the veins are not prominent and very rarely branched, but as a rule run straight from midrib to margin. This character can be used to distinguish very young plants before the middle leaflet in the hop clovers is stalked (Fig. 2, right). Both hop clovers have yellow blossoms, those of the low hop clover being sulfur-yellow, and of the least hop clover golden yellow. In the low hop clover each head contains many flowers, about 20 to 40, while there are usually 5 to 15 flowers in a head of the least hop clover. These two hop clovers are most easily distinguished by the flower color and the number of

flowers in a head. When not in flower they are almost indistinguishable, but the stems of the low hop are more hairy than those of the least hop clover.

In size, the Carolina clover varies from two to three inches high on poor dry land to nearly a foot in moist places or on rich land. The hop clovers vary in size even more than the Carolina clover. On poor soil they have been known to blossom when little more than an inch high, while when conditions are favorable the prostrate branches may be two feet long. The hop clovers are always prostrate in habit except when the stand is so thick that the plants support each other. In such cases, which the writer has seen in Louisiana and Arkansas, each plant consists of one threadlike stem 10 to 12 inches long, and

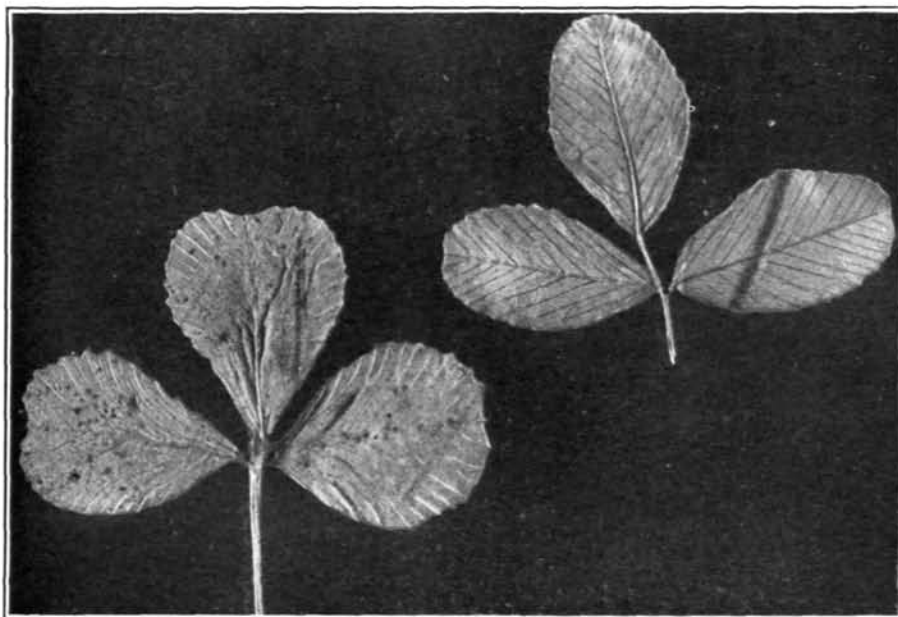


Fig. 2.—Leaf of Carolina clover (left) and of low hop clover (right), showing the stalk on the middle leaflet of low hop clover and the prominent branched veins in the leaf of Carolina clover. In the hop clovers the veins are unbranched. The shape of the leaflets is not always as distinctive as in these photographs

the field can be cut for hay. Both species mature early in June, after which the hop clovers disappear completely, while some of the Carolina clover plants may live over. The Carolina clover is said to be a perennial, but the writer has found little evidence to support this. However, his personal observations have been confined to May and June, and some observers have reported the Carolina clover as being green in November. The hop clovers seldom get much of a start before the middle of January, but after that they grow rapidly during any warm days.

The Carolina clover grows quite upright (Fig. 1, left), and mowing the fairway is quite certain to cut most of the blossoms and so interfere with reproduction. The hop clovers, on the other hand, are of a prostrate habit, and thus will bloom and mature seed in spite of moderate mowing.

No seed of the Carolina clover is available commercially; but where it is abundant, seedheads can readily be gathered and scattered where wanted. Seed of the low hop clover is not to be had in quantity, but that of the least hop clover can be bought in England under the name suckling clover or *Trifolium minus*. It can also be had from certain seed dealers in Oregon, who clean it out of alsike clover seed; but the Oregon seed is usually quite foul with weed seeds and there is at present no information as to how these weeds will behave in the East. Seeding of all of these clovers should be done in early fall or late summer. Much of the seed of the Carolina clover is hard, so that if a quick stand is wanted a rather heavy seeding must be made. No experiments have been made with these plants, but in view of the small size of the seed it seems as though five pounds per acre of the hop clovers and eight pounds of Carolina clover should be enough. To insure even distribution it is well to mix the seed with sifted loam or sand.

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## Humus-Producing Materials and the Making and Use of Compost

By R. A. Oakley and H. L. Westover

Organic matter, or humus, as a constituent of soil, bears a very important relation to the growth of plants. This is a fact that was discovered by man early in his agricultural efforts. Just as he had a knowledge of the plants that were worth his while to grow, it is reasonable to suppose he early learned the difference between poor and productive soils, and what common substances he could add to them to increase their productivity. That he knew little of the reasons for the results he obtained is not particularly to his discredit. Even in our enlightened generation we have failed to work out the complete story. But we have added to it and today we know more of the role of organic matter in the soil than we knew yesterday. Tomorrow we may make a further advance in our knowledge, for investigators are attacking the subject along some very promising lines.

The modern conception of fertilizers attaches even more importance to humus than was ever before accorded it, and this regardless of the efforts of Liebig and other apostles to argue the all-sufficiency of inorganic forms of nitrogen, phosphorus, and potassium. Good barnyard manure heads the list of fertilizers today, as it has headed it for generations, and will probably continue to head it for some time to come. Other fertilizers are highly important, but they can not fully replace this humus-supplying material.

### HUMUS DEFINED

In the sense that it is now used, the word humus applies to decaying organic matter, or more strictly to decaying organic matter in the soil. In its adjective form the same word is used to designate organic materials that make humus when added to the soil. Common practice has made this usage acceptable.