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Cornell University professor tells which chemicals controlled weeds best during tests.

Turf weed research

By Dr. Arthur Bing, Professor, Dept. of Floriculture and Ornamental Horticulture, Cornell University, Riverhead,

The research this past year was mostly on corn speedwell (*Veronica arvensis*), ground ivy (*Glechoma hederacea* L.), and yellow wood sorrel (*Oxalis stricta*), with observations on other weeds that may have been in the plots.

Spring postemergence treatments on corn speedwell, which is a winter annual, were successful in 2 tests with bromoxynil (Brominal Bucril). Dicamba, 2,4-D, MCPP or combinations of these were not very effective. The 2,4-D plus 2,4-DP treatment gave variable results, causing some burn initially. Dacthal 75 WP, applied postemergence at 12 lb active ingredient per acre (ai/A), did not look like it did much after a couple of weeks, but after six weeks it gave very good control. Although bromoxynil gave good control of corn speedwell, it was ineffective against some other weeds which will be mentioned later. This fall, preemergence treatments were made with several herbicides to see if this might be an approach to controlling corn speedwell.

In previous experiments, 2,4-D plus 2,4-DP looked good for postemergence control of ground ivy. Working with Vincent Calabro at St. John's Cemetery, we put out a good test on ground ivy September 10. The area was irrigated and had a good stand of the ivy. After one month there was nearly excellent control of ground ivy by the use of 2,4-D plus 2,4-DP at the equivalent of one pound of 2,4-D ai/A. The 2,4-D plus dicamba at usual rates only gave fair control. Bromoxynil and combination of 2,4-D plus MCPP plus

dicamba at usual rates gave poor control.

Yellow wood sorrel is difficult to control because of seeds in the soil; some forms are perennial with an extensive underground stem growth. The ripe seeds are shot 10-15 feet from the pods, spreading this weed all over the place. The only material to give good control in 2 tests was the 2,4-D plus 2,4-DP combination at one pound ai/A, applied in May or June. Bromoxynil or combinations of 2,4-D, MCPP and dicamba were not effective.

This summer, **prostrate spurge** was more of a problem than usual. Only bromoxynil gave good postemergence control when applied in June. Weedone 20 and a 2,4-D plus 2,4-DP liquid formulation gave fair control.

White clover was very effectively controlled with 2,4-D plus MCPP or 2,4-D plus 2,4-DP. Common chickweed was not controlled by a June spray or bromoxynil, but there was good control with MCPP and excellent control with 2,4-D plus 2,4-DP.

Buckhorn plantain and **dandelion** were best controlled by 2,4-D. Bromoxynil in these tests did not give adequate control.

It seems that 2,4-DP (which is similar to silvex in chemical structure except for one chlorine less on the benzene ring) is a more than ample substitute for silvex in most uses. The one problem may be **mugwort** (*Artemisia vulgaris* L.), which was controlled by silvex, but was not controlled by 2,4-D plus 2,4-DP in a limited test.

Wild onion and **wild garlic** are

perennials that have onion-like leaves that you can rub and smell if there is any question about their identity. They form tall clumps of hollow, round stems and leaves in the spring before the grass has grown enough for mowing. They are propagated by underground bulbs that can remain dormant for several years, by bulblets on the top of the stem and by seeds, making control very difficult. Persistent use of 2,4-D with a wetting agent or on a waxbar before grass mowing starts is most effective.

Yellow wood sorrel, which is more often called by its scientific name, *Oxalis*, can be an annual or a perennial spread by seeds shot 10-15 feet from the elongated seed pods when ripe. Flowers are yellow. The 3-part (palmate) leaf looks like clover except that it is notched at the end. The perennial form has purple-tinged leaves and flowers and can spread by rootstocks. Postemergence control with 2,4-DP is possible.

White clover is a perennial lawn weed with 3-part (palmate) leaves and white flowers. Its creeping stems are very vigorous. On poorly maintained lawns it may be the only green color, especially during dry weather. It also makes its own nitrogen supply from the atmosphere with symbiotic bacteria. It may be undesirable because it stains clothing and the flowers attract bees. Control is good with 2,4-D plus 2,4-DP or MCPP.

Black medic has leaves similar to clover but much smaller, with a small inflorescence of yellow flowers. It is an annual or winter annual without the extensive creeping stems of white clover. It forms dense mats from the prostrate branching stems, but is not usually competitive in a good lawn, as is the case with white clover. Black medic is controlled by MCPP, dicamba or 2,4-DP.

Common dandelion is a perennial whose light seeds that have a parachute like structure are carried great distances by the wind. The plant has a deep, fleshy tap root, a basal rosette of deeply-cut long leaves, and leafless hollow stems each with a yellow composite flower and later a feathery seed head. Any part of the taproot can start a new plant and the seeds are blown great distances. Dandelion is very susceptible to 2,4-D.

Broadleaved plantain and its close
Continues on page 29

Answers to Weed Identification Quiz, page 21

A. Mouseear Chickweed; B. Crabgrass; C. Yarrow; D. Goosegrass (silver crabgrass); E. Prostrate knotweed; F. Creeping speedwell; G. Dandelion; H. Goosegrass (silver crabgrass); I. Broadleaved plantain; J. Perennial white clover; K. Yellow nutsedge; L. Annual bluegrass (*Poa annua*); M. Tall fescue; N. Buckhorn plantain; O. Corn speedwell; P. Red sorrel; Q. Mugwort; R. Nutsedge; S. Healall; T. Prostrate spurge; U. Black medic; V. Ground ivy; W. Oxalis.

Photos courtesy of New York State Turfgrass Association's "Weeds of Turfgrass" slide set. Copies of the entire set may be obtained from Ann Reilly, Executive Secretary, NYSTA, 210 Cartwright Blvd., Massapequa Park, NY 11762, phone 516/541-6902.

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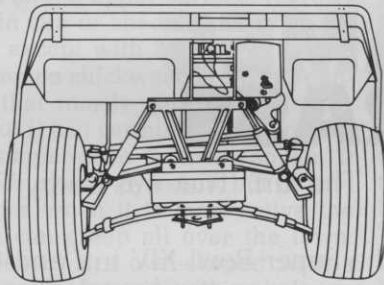
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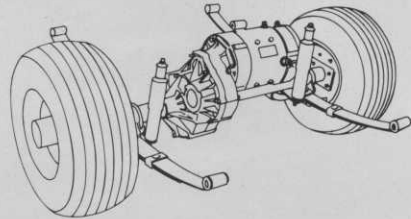
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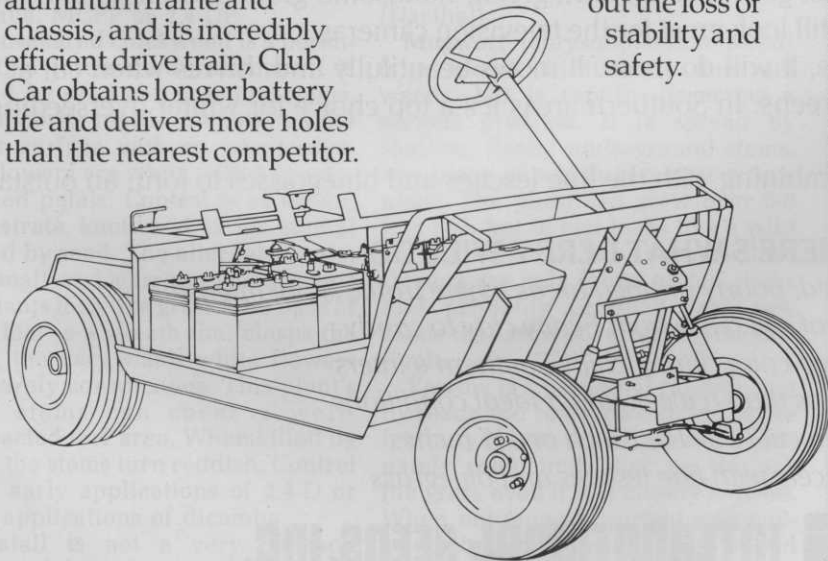


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relative, **Rugel's plantain** or black seeded plantain, are perennials spread mostly by seed from wiry flower spikes with flowers along most of the stem. The leafless stems arise from the basal rosette of large, wide, nearly oval smooth leaves and a fleshy, fibrous root system. New shoots grow from the roots. Control is easy with 2,4-D.

Buckhorn plantain (narrow-leaved plantain) is a perennial spread by the many seeds on the wiry stalks that grow from the basal rosette of long narrow leaves. The flowers are on a short section at the tip of the flowering stem. Many lateral shoots develop from the thick fleshy roots, making large clumps. Seeds are spread by lawnmowers and wet shoes. Control is easy with 2,4-D.

Ground ivy (creeping Charlie) is a creeping perennial lawn weed spread by seeds and stems that root at the joints, forming dense mats. It has square stems and opposite, roundish leaves that are scalloped around the edge, heavily veined and rough on the upper surface. It grows well in sun or shade. Control is difficult except with 2,4-DP.

Common chickweed is a winter annual that mostly germinates in the fall but it can germinate anytime the soil temperature is cool enough. It spreads mostly by seeds, but in cool weather when it is most active the stems can creep all over the lawn. The leaves are oval-shaped with a point on the far end, with no hairs on the smooth-edged blade. Leaves are opposite. The small white flowers appear in early spring. Control with dicamba, MCPP or 2,4-DP.

Mouseeared chickweed is a perennial that forms dense clumps. It is spread by seed and creeping stems. The opposite leaves are hairy on the upper surface with an uncut edge. The flowers are white with 5 deeply-notched petals. Control is as above.

Prostrate knotweed is an annual spread by seed. The alternate leaves are small and narrow; when young the plants look like grass. The base of each leaf is a sheath that clasps the stem; the very small white flowers are barely conspicuous. This plant's wiry stems can cover a well-compacted turf area. When killed by frost, the stems turn reddish. Control is by early applications of 2,4-D or later applications of dicamba.

Healall is not a very common perennial, but where it occurs it can take over a turf area, forming a dense mat. It is a mint, with square

stems and opposite, smooth, oval, somewhat pointed leaves. It is spread rapidly by seeds from purple flowers and by vigorous rootstocks. Healall is controlled by dicamba.

Red sorrel (*Rumex acetosella* L.), (sheep sorrel, sour grass) is a vigorous perennial spreading by seeds and rootstocks. It is usually found in areas of low fertility and low pH. The leaves have a very characteristic shape with the 2 ears at the base. The flowers in the spring can be green to bright red. The leaves are loaded with oxalic acid, which gives the plant the sour taste and its name. Dicamba gives control of red sorrel.

Creeping speedwell (*Veronica filiformis*) is a tiny leafed creeping perennial which forms large dense patches totally overcoming the grass. The leaves are small roundish crinkled on the surface with a slightly toothed edge. The conspicuous bluish flowers each has a long thread like stem that arises from a leaf axil. It is spread entirely by pieces of stem cut and moved by mowing equipment. Control by spraying with DCPA (Dacthal) when in flower.

Corn speedwell (*Veronica arvensis*) is a winter annual which can spread very rapidly in a lawn. The seeds germinate mid-August and later. The small leaves are toothed. The stems are upright in small clumps. The flowers are very small, bright blue in terminal spikes. The seed pods are an inverted heart. Control is by postemergence spraying with bromoxymil or DCPA (Dacthal).

Mugwort (*chrysanthemum weed*) is a recent addition to our turf weeds, but is rapidly becoming a serious problem. It is spread by shallow, fleshy underground stems, any piece of which can start a new plant. The plant can grow over 5-6 feet tall, but in turf looks like a wild chrysanthemum. The inconspicuous flowers are only found on tall stems and probably produce very few seeds that grow. Control may be difficult.

Yarrow is a perennial reproducing by seeds and rootstocks. In lawns the feathery leaves, which are twice pinnately compound, stick up through the grass even if it is closely mowed. When not mowed, upright stems 10-40 inches tall bear a flat-topped dense compound inflorescence of white flowers. Control with dicamba or 2,4-DP. **GB**

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Crabgrass and goosegrass control with herbicides in bermudagrass turf

By B. J. Johnson¹

Turfgrasses are important in beautification of the surrounding environment. In most instances we as individuals let the turf take care of itself or we give it only a little attention. When this happens, turf managers or home owners may wonder why this results in a poor quality turf infested with weeds.

Crabgrass (*Digitaria sanguinalis*) and goosegrass (*Eleusine indica*) are major weeds that infest turfgrasses throughout the Southeast. A common management practice is the application of preemergence herbicides before these weeds emerge in the spring. Herbicides must be used at the correct rate and at the proper time to insure maximum weed control. Regardless of herbicide selection, it may be necessary to apply the treatments annually to maintain a high level of weed control. For a herbicide to be acceptable, it must control weeds without injuring turfgrass.

Crabgrass Control

Short-season control. When preemergence herbicides are applied in early spring and control weeds only through May or June, this is considered to be short-season control. In our studies, treatments of Dacthal, Balan, Betasan, or Ronstar controlled crabgrass effectively during this period. Our results indicate that all of the above chemicals gave consistent short-season crabgrass control. Good early-season crabgrass control is shown in Figure 1 (page 32). Therefore, when control is desired for only a 2 to 3-month period, the selection of herbicides is not a major problem provided chemicals are applied prior to crabgrass emergence.

Full-season control. When preemergence herbicides are applied in the spring and controls crab-

grass effectively throughout the summer, without additional treatment, this is referred to as full-season control. We found in our studies that Balan and Dacthal failed to provide consistent crabgrass control while Betasan and Ronstar controlled the weed effectively throughout the summer. Generally, Balan controlled crabgrass for 2 months and then weeds began to germinate and emerge. This was true throughout the Piedmont region of Georgia. In the Mountain region where spring and summer temperatures were cooler, Balan controlled crabgrass slightly better with a single application. However, the control was not consistent each year. The chemical may control the weeds completely in a given year, but poorly the following year. This occurred even when the chemical was applied at the same rates and dates each year.

Betasan and Ronstar resulted in good to excellent crabgrass control in our studies from a single application each year. Therefore, for effective full-season crabgrass control it is important to select a chemical that will provide long term control. The residual activity of Balan and Dacthal was not as good as with Betasan and Ronstar.

Multiple-year treatments. Balan applied in March and May controlled approximately 75% of crabgrass during the summer in the Piedmont region of Georgia. When the second application was delayed until June, crabgrass control was poor and unacceptable. This occurred since crabgrass had already germinated when June treatments were made. Therefore, time of second treatment was very important in maintaining a high level of crabgrass control as shown in Figure 2 (page 32). The control was similar whether the initial March treatment was applied at 2 or 3 lb/ai/A when followed by the 2 lb ai/A in May. Crabgrass control was improved only slightly when Balan was applied in 3 applications (March and May and July) when compared with control from 2 applications (March and May).

Crabgrass control in the Mountain region of Georgia was also improved from March and May treatments. In

all instances the control at the Mountain location was slightly better than at the Piedmont location. This indicates that cooler spring and summer temperatures following Balan treatments were desirable as a higher percentage of crabgrass was controlled over a longer period than when similar treatments were applied in warmer areas. It should be emphasized that multiple Balan treatments did not control crabgrass any better than did single treatments of either Betasan or Ronstar.

Two applications of Dacthal (March and June) did not produce any higher consistent crabgrass control than did a single March treatment. Two factors that may have contributed to the inconsistent control from repeated treatments were: a) the initial 10 lb ai/A rate of Dacthal may have been too low and b) the second application probably should have been applied in May rather than June. The amount of control may improve by using higher rates and repeated treatments made closer together.

Dates of preemergence treatments. In most instances for preemergence herbicides to be effective in controlling crabgrass, the chemicals must be applied prior to emergence of weeds. In our studies, Betasan or Ronstar controlled crabgrass equally as good whether the chemicals were applied in mid February or March. In all instances the control was reduced when treatments were delayed until April or May. The difference in dates of treatment on crabgrass control is shown in Figure 3 (page 32). Balan applied as a single treatment at either date did not control crabgrass nor did Dacthal control crabgrass consistently.

These results indicate that herbicides should be applied in February or March for best preemergence crabgrass control. In general, the control will not be as good when treatments are delayed until April. These results differ from those reported in the northeastern United States where temperatures are colder in early spring. When the mean temperature reaches 55°F for a

Continues on page 32, 34

¹Professor of Agronomy, University of Georgia, Georgia Station, Experiment, Georgia 30212. Supported by State, and Hatch funds allocated to the Georgia Agricultural Experiment Stations.

²Trade names for herbicides are included for the benefit of the reader and do not imply any endorsement or preferential treatment.