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In This Issue

The Cover

This overall view of some nimblewill-infested Kentucky bluegrass plots shows results of experimental treatments to control the pest. Nimblewill is not only a serious problem for the homeowner but also is one of the troublesome weeds in old bluegrass pastures. Pictured here is Horticulturist J. W. Herron evaluating different treatments designed to control nimblewill but not seriously injure bluegrass. (See page 4 of this issue for an article giving details of the experimental work.)

Kentucky Research Results in Brief

By FRANK B. BORRIES, JR.
Department of Public Information

GAMMA RAYS ARE USED IN FOOD PRESERVATION PROJECT

What's new in food processing?

It is irradiation—treating foods with doses of gamma rays.

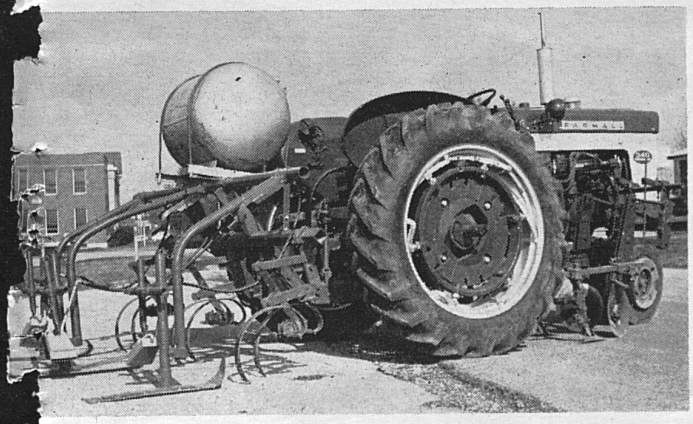
This research in a relatively new field of food preservation is a joint project of the U.K. Agricultural Experiment Station, conducted by the Department of Horticulture and the School of Home Economics.

Irradiation first got attention 12 years ago when the Army recognized that if fresh foods could be preserved other than by refrigeration, part of the armed forces' food-storage costs would be considerably reduced. A package of fresh food (if irradiation could be made to work) with a long "shelf life" at room temperature would be invaluable.

Horticulturist D. C. Martin, specializing in food processing, and Home Economist Doris Tichenor say their work so far has been concerned with a type of food (normally stored by freezing) that could be held at above-freezing temperatures.

Two foods they are working with at present are strawberries and sweet corn, both food items high on the desirability list of servicemen.

"Our research is still in the primary stage," Martin says. "The work is promising but no final results have been reached. In strawberries, for instance, we can't irradiate them at certain levels and have them look good. They lose color and sometimes the texture of the berries is not desirable. The same has been true of corn and broccoli. We've been a little more successful with sweet corn; we've kept the texture fairly good and have not had great losses of sugar. When you lose sugar in the storage period, you may alter certain things such as appearance, taste, etc."



This flame-type cultivator, mounted on a two-row conventional cultivator, has been tested sufficiently to enable U.K. agricultural engineers to make recommendations for its use in corn and soybean plantings.

The researchers say their approach to the irradiation of fruits and vegetables is to "administer a pasteurizing dose of gamma rays to the foods so they will stay edible at higher temperatures than encountered in frozen storage." The usual storage temperature of their experimental samples has been 35 degrees F.

One area of research has been in removal of oxygen from the irradiated foods. The air in the can is either replaced with nitrogen gas before sealing, or a small amount of enzyme is added which chemically ties up the oxygen in the headspace (top of can) air. Elimination of free oxygen by these methods seems to slow down unfavorable changes.

Wholesale use of irradiation to preserve foods will not be perfected quickly, Martin believes. Certain foods will take irradiation better than others. Also, irradiation is a new concept in food preservation and much basic research is necessary to prove its effectiveness. But Martin hastens to say: "The public can be sure of one thing: When irradiated foods are put on the market, they will be as safe and as nutritious as foods processed by any other method."

FLAME-WEEDING WORK TRIED OUT FOR THREE YEARS AT U. OF K.

Flame-weeding of crops by U. K. Agricultural Experiment Station agricultural engineers for three years has worked well enough that recommendations can be made now for some crops.

Flame-weeding to the layman is killing pesky weeds in hard-to-get-at crop areas by "live" flame. A tractor, mounting a tank of liquefied petroleum gas and special burners near ground surface, is used: The burners spurt flame onto the weeds for a fraction of a second.

E. H. Smith, agricultural engineer, says Kentucky farmers can use flaming on weeds in corn crops now

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Nimblewill in Kentucky Bluegrass Lawns Controlled by Herbicides

Zytron proves effective in selective control tests that began in 1953; Banvel D shows promise

By J. W. HERRON
Department of Horticulture

Nimblewill[1] is increasing in importance as a pest in Kentucky bluegrass lawns in Kentucky as well as many neighboring states. It is not only a serious problem in lawns, but in Kentucky nimblewill is one of the most troublesome weeds in old bluegrass pastures.

Nimblewill, a shallow-rooted perennial grass, reproduces by seeds and underground stems. New growth starts from underground stems in February and early March. It continues to grow throughout the summer and early autumn. The roots remain alive throughout the year, but the tops die in autumn, leaving dense brown mats in the lawn.

Much progress has been made in the chemical control of nimblewill in Kentucky bluegrass turf. Experimental studies on the control of nimblewill were begun by the Kentucky Agricultural Experiment Station in 1953. From 1953 to 1958 maleic hydrazide was the only material tested that showed any degree of selectivity on bluegrass. Even though high rates

[1] *Muhlenbergia schreberi* J. F. Gmel.

SUMMARY

Results of nimblewill control experiments, 1959 to 1961, can be summarized as follows:

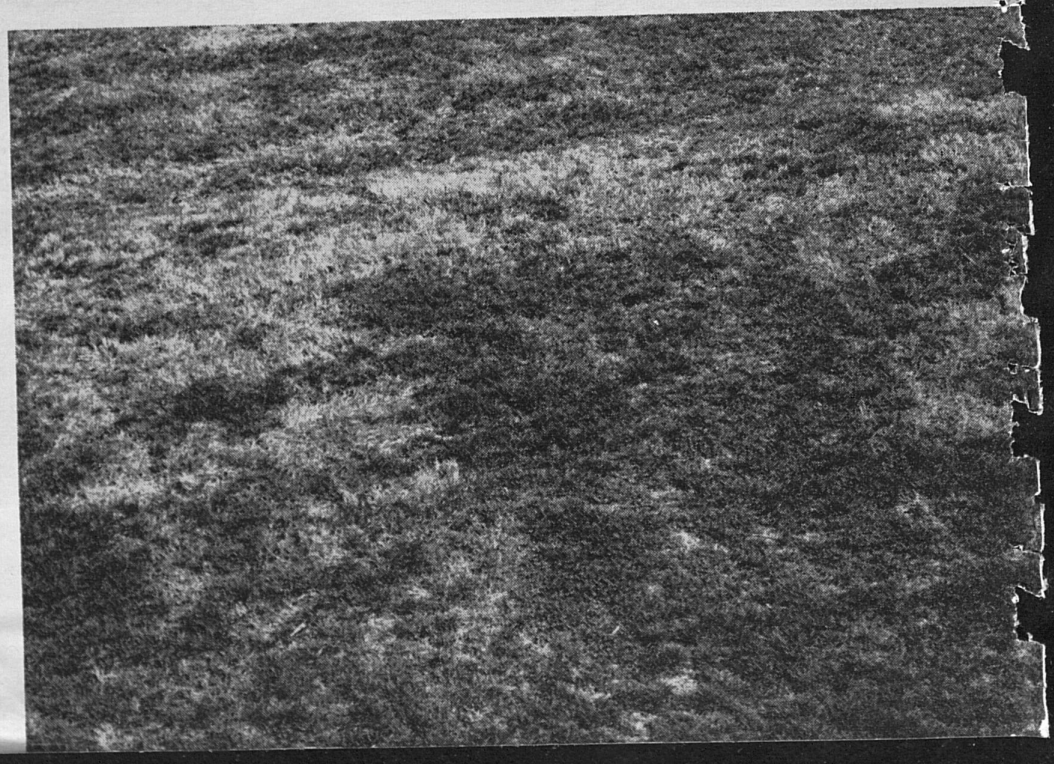
1. Two applications of liquid Zytron at 15 lb/A rate are necessary for satisfactory control of nimblewill. One application at 30 lb/A rate also gave good control.

2. To obtain complete eradication, some spot applications following the initial treatments with Zytron may be necessary.

3. Treatments with liquid Zytron in the spring and early summer appeared to be more consistently effective than treatments in late July, August, and September.

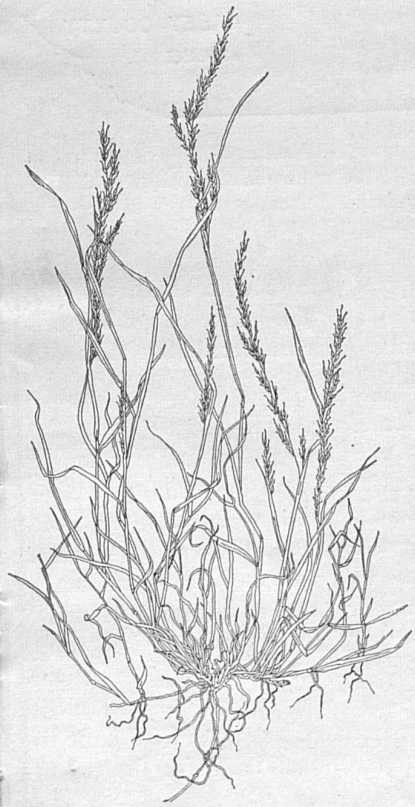
4. Dry formulations of Zytron were not effective in controlling nimblewill.

5. Although Banvel D at rates of 4 and 8 lb/A gave variable control of nimblewill with one application, results indicated that continued studies concerning rates and times of applications are warranted.



Plot in the right foreground was treated with liquid Banvel D at the rate of 4 pounds per acre. Rest of the area shown was untreated.

The plot in the foreground was treated with two applications of liquid Zytron at the rate of 15 pounds per acre. The rest of the area shown was untreated. Granular Zytron was not effective in these experiments.



This drawing shows the entire nimblewill plant. Note the shallow roots, slender creeping stems and the ascending seed heads. The plant reproduces by seeds and rhizomes. From fall until early spring the plant remains dormant and brown. In the summer it is light green.

of maleic hydrazide gave good control of nimblewill without killing bluegrass, very severe top injury to the bluegrass occurred. Results of these early tests were reported in 1955[2] and 1958.[3]

In 1959 Zytron[4] was included in the tests. Both the emulsifiable concentrate and granular formulations were applied periodically throughout the growing season at rates of 10, 20, and 30 pounds per acre (hereafter expressed lb/A). The granular formulation was not effective; consequently, the liquid formulation was the only one included in the 1960 and 1961 experiments. Late summer and early autumn applications of the liquid formulation did not give as consistently effective control of nimblewill as the spring and early summer treatments.

Two new experimental herbicides were included in the tests in the summer of 1961. The emulsifiable concentrate formulations of Banvel D at 2, 4, and

(*Continued on Page 8*)

[2] Herron, James, Nimblewill in Bluegrass Lawns. Ky. Farm and Home Science. Spec. Prog. Rpt. 1:23 July 1955.

[3] Control of Nimblewill in Bluegrass Turf. Proc. NCWCC 15:37. 1958.

[4] Chemical composition of the materials mentioned is given at the end of the article.

Persons and agencies concerned with activity programs for "senior" citizens helped by recent U.K. survey

Leisure Time Activities of Older Persons in Kentucky Studied

By E. GRANT YOUMANS[1]
Department of Rural Sociology

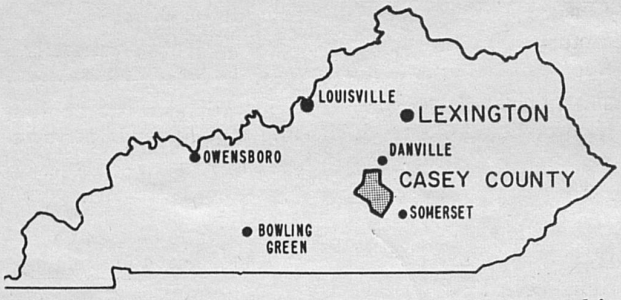
The amount of leisure time available to men and women in the United States has increased markedly in the past 100 years. Because of a longer life expectancy and a shorter work week, men today have much more free time than in the past. For the average housewife, with an even longer life expectancy and doing simplified homemaking, the increase in leisure time is even greater. For many older persons in the United States today, almost all waking hours are leisure time.

This abundance of free time suggests some important questions. How is free time used? Is it used wisely? Should free time be spent primarily in play, recreation, and amusements? What principles can be suggested for setting up activity programs for older persons? The lack of clear-cut answers to such questions points up the need for studies of how older persons use their free time.

In 1959 a survey[2] was made of men and women aged 60 and over living in rural and urban Kentucky. A total of 1,236 persons were interviewed, half in Casey county and half in Lexington. No persons in institutions were included. They were asked questions about their use of free time, such as their family visiting, their community activities, and their hobbies and pastimes.

Visiting With Children

Almost half the older persons (44 percent) reported that they lived in the same household with one or more of their children. Two-thirds of the older persons (67 percent) reported that one or more of their children lived within a distance of 9 miles, and 86 percent had one or more of their children living more than 10 miles distant. The average distance of the older person from one or more of his children was 45 miles. As might be expected, the frequency of visits between the older person and his children varied with the proximity of his children. Weekly visiting was the typical pattern with children living apart but within 9 miles, monthly visiting was the typical pattern with children living 10 to 49 miles away, and 2 to 4 visits per year was the typical pattern with children living more than 50 miles away. The older urban persons visited more frequently with their children than did the rural older persons.



The men and women surveyed lived in Casey county and in the city of Lexington. Casey county is in south-central Kentucky and is relatively isolated from any large urban community.

Community Activities

The older persons participated, on the average, in 1.6 clubs and organizations, with little difference between those in rural and urban areas. Almost all the respondents participated in some form of church activity, and for most this was the only community activity. The rural older persons engaged in more informal community activities, such as visiting and helping friends and neighbors, than did the urban older persons.

The older persons named an average of 2.6 hobbies per person, 2.5 for the rural and 2.7 for the urban

[1] Social Science Analyst, Economic Research Service, U. S. Department of Agriculture.

[2] The survey was made jointly by the Department of Rural Sociology, University of Kentucky, and the Farm Population Branch, Economic and Statistical Analysis Division, Economic Research Service, U. S. Department of Agriculture. A more detailed report appears in Progress Report 115, "Leisure Activities of Older Persons in Selected Rural and Urban Areas of Kentucky," published by the Kentucky Agricultural Experiment Station.

person. Only 5 percent had no favorite hobbies. The most popular hobbies or pastimes named (in descending order) were: watching television and listening to radio (52 percent), reading (36 percent), meetings (28 percent), gardening (26 percent), sewing (26 percent), sit and think (13 percent), fishing and hunting (13 percent), sports (11 percent), and playing cards (9 percent). Small percentages named such activities as travel, movies, writing letters, crafts, dancing, and collecting. Slightly more urban than rural persons named movies, sports, cards, crafts and dancing, and slightly more rural than urban persons named informal visiting and fishing and hunting. More women than men mentioned reading, sewing, and letter writing.

Implications and Suggestions

Persons and organizations planning activity programs for older people might keep a number of principles in mind:

(1) What older persons are now doing may not be an accurate indication of what they can do. (2) Leisure activities of older persons should be a satisfactory substitute for the work-oriented activities they have engaged in most of their lives. (3) Activities should be tailored to meet the needs of older persons living in widely different circumstances and situations. (4) Leisure activities of older persons cannot be based entirely on entertainment and recreational pursuits. (5) Proposed activities can be developed without the fear that older persons will reject all complex and difficult tasks. (6) Organized community, civic, educational, and religious groups might attempt to develop special programs for older persons. To be successful, such programs should meet the needs and interests of the elderly, should provide suitable tasks which use the talents possessed by older persons, and should stimulate the imagination and creative energies of older citizens.

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(*Continued from Page 3*)

and be safe. Flaming can also be used in soybeans with certain restrictions. He tried the system on young tobacco last year with some success but has not had enough practice on this valuable crop yet to say whether the plan is completely safe and workable.

He also flame-weeded a field of sorghum just to see what the results would be. It was entirely successful, eliminating a heavy growth of foxtail. But, as in tobacco, there hasn't been enough research and field testing yet to settle recommendations.

Here are some of the recommendations:

CORN: Flaming can be done when the plants are almost any height. (High-clearance equipment would be needed, of course, when corn is 5 or 6 feet high; but it is doubtful that a corn crop of that height would need weed-flaming if the operation had been done once or twice previously that season.)

In the U. K. field tests, corn was flame-weeded without damage when it was just emerging and up to when it was 2 or 3 feet high. In the emerging stage the flaming burned off the tiny corn plants but they came back strong. At season's end the corn so weeded was as tall as the non-flamed rows, Smith said.

One thing to watch in corn: Keep the row band (the area where the plants are actually growing) as flat as possible. This is necessary because the flame jets are directed at the ground from an angle. When the flame hits, it can spread evenly over a flat row band and hit the weeds. An uneven row band will direct the flames upward or sideward away from the weeds in a drill row. To promote this flat row band, disks were installed on the test equipment in front of the burner. They replaced the usual two front sweeps on standard cultivators. These disks "bar off" the row bands and promote flat surfaces.

Use regular cultivation practices in the row middles. Flaming weeds there would be too expensive, Smith says.

SOYBEANS: Plants should be 8 to 10 inches high. Any plants smaller than that may be killed by the flaming, as happened in some of the U. K. tests. Currently smaller burners are being tried. These direct less flame at the drill row area and expose the plants to flame a shorter length of time. This may make it possible to flame-weed soybeans when they are 2 to 3 inches tall.

Flaming is a cheap method of weeding, as it costs about 50 to 75 cents an acre for fuel. However, it is not a cure-all weeder; it *merely supplements (not replaces)* other methods such as chemicals and cultivation.

Smith stresses the safety factor of flame-weeding. The flames do not burn the weeds on contact, as the exposure time is too short. Apparently the short-period heating causes rapid evaporation of moisture from leaves, and this causes the plants to die. Smith estimates the flames touch the weeds from one-tenth to as low as one one-hundreth of a second. This ex-

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posure time depends on ground speed of the tractor (usually about 3 miles an hour in corn) and the size of the burner.

If the pressurized gas in the tanks should leak, the fuel is dissipated to the open, Smith points out, where there is little if any danger to humans. The tanks themselves are extremely strong, more than strong enough to hold the pressurized fuel.

Nimblewill Controlled by Herbicides

(*Continued from Page 5*)

8 lb/A and Banvel T at 18, 12, and 16 lb/A were used, in addition to Zytron at 7.5, 15, and 30/lbA. The treatments were applied on June 13, 1961. Results of these treatments are shown in the accompanying table.

RESULTS OF HERBICIDE TREATMENTS ON NIMBLEWILL

MATERIALS USED	RATE, lb/A	PERCENT INFESTATION 9/29/61* (Av. of 3 replications)
Zytron	7.5	88
Zytron	15	50
Zytron	30	13
Banvel T	8	48
Banvel T	12	51
Banvel T	16	71
Banvel D	2	75
Banvel D	4	40
Banvel D	8	42
Check		98
LSD 0.05	18	
0.01	31	

* Infestation of nimblewill on all plots at time of treatments was 90% or greater.

Information from the 1961 tests indicated that one application of Zytron at the 7.5 and 15 lb/A rates was not sufficient to give satisfactory control of nimblewill. Although one application of Zytron at 30/lb/A gave satisfactory control, the nimblewill was not completely eliminated and some additional spot treating may be necessary this year (1962).

One application of Banvel T had some effect on the nimblewill but did not give satisfactory control. The 16 lb/A rate was less effective than the 8 lb/A and 12 lb/A rates. Banvel D applied at rates of 4 and 8 lb/A and Banvel T at 8 and 12 lb/A gave comparable results. Banvel D at 2 lb/A and Banvel T at 16 lb/A had very little effect on the nimblewill. No injury to the bluegrass was observed on any of the treated plots.

In a private lawn an area of approximately 1500 square feet of bluegrass turf with a sparsely scattered infestation of nimblewill was treated with Banvel D at the rate of 6 lb/A on Aug. 20, 1961. Although definite conclusions cannot be determined until this summer (1962), there appeared to be complete kill or very severe injury of most of the nimblewill in the treated area. The nimblewill rhizomes, as well as the tops, showed the effect of the treatment. Dwarf apple trees, privet, weigelia, and grapevines were growing in the treated area. No injury was observed in the grapes. However, 2 weeks following application of the Banvel D, injury symptoms appeared on the leaves of the privet, weigelia, and apple trees. These plants were growing on a slope and the symptoms did not appear until after a heavy rainfall, which may have washed some of the material into the root zone. It will not be until the spring or summer of 1962 that the extent of injury can be determined. Annual flowers at the edge of the treated area were not injured.

In addition to controlling nimblewill, liquid Zytron will also control crabgrass if applications of the material are made when the crabgrass is not beyond the 1-inch stage of growth.

Although Banvel D has been included in the tests for only one year, results are sufficiently promising to warrant further testing. Much additional information regarding rates, timing, and possible injury to desirable plants is needed. Banvel D shows considerable promise in controlling red sorrel (*Rumex acetosella*) and several other "hard to kill" broadleaf turf weeds that have not been satisfactorily controlled by other herbicides tested.

* * *

Chemical composition of materials used in herbicide studies:

Zytron: 0-(2,4-dichlorophenyl) 0-methyl isopropylphosphoamidothioate

Banvel D: 2-methoxy-3,6-dichlorobenzoic acid

Banvel T: 2-methoxy-3,5,6-trichlorobenzoic acid

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