

Ohio

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RESEARCH

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OHIO Farm and Home Research

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Station Calendar

Readers will note that this issue is larger than average. In view of an abundance of timely material, a 24-page edition was planned to pass this new information on to you so that it could be used as soon as possible. Stories in this issue include contributions from many of the Station's departments and cover a wide range of subject matter.

Plans are being completed for the special days to be held at the Station during the summer. Detailed programs will be available soon for several of them.

A highlight of Beef Cattle Day on June 10 will be a summary of the work to date with stilbestrol. This will cover both the use in feed and the injection method and should be of considerable interest to beef cattle producers since the work has been attracting nation wide attention.

Read About . . .

- MAPLE BLADDER GALL** is being prevented by killing the mites that cause it. Several sprays are used **page 35**
- HIGH MOISTURE WHEAT** can be harvested if it is dried later. Methods are outlined on **page 36**
- ANTIBIOTICS FOR CALVES** seem to promote growth during the first six months and help keep down disease **page 38**
- WIDE CORN ROWS** are made possible through adapting machinery now available. A listing appears on **page 40**
- BENTGRASS** responded well to treatments of chlordane and bird feeding damage was reduced **page 43**
- RED CLOVER** is pollinated by honey bees despite the belief that bumble bees were the only effective means **page 44**
- THINNING APPLES** with chemicals has been given more research at the Station and the suggestions appear on **page 45**
- FARM FAMILY** studies show that many of the young men marry girls with a city background. The trend is explained on . **page 47**
- DAIRY FARMS** can use conservation practices. The discussion of their use is on **page 50**
- TWO METHODS OF TREE REMOVAL** were used in a Station orchard and a breakdown of the relative costs was shown **page 52**
- GRAIN FEEDING** on both liberal and limited rations and the effect on milk production was observed in a recent project **page 54**
- MALFORMED ROSE FLOWERS** is not an inherited strain but results from a number of other causes **page 55**
- ECONOMIC TRENDS** are discussed on **page 56**

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On the Cover

Baling hay will soon be a familiar sight over Ohio. In the background can be seen a part of the new dairy barn on the new Station farm near Castalia.

Upon written request to the Mailing Room your name will be placed on the mailing list to receive this free magazine every other month. When reprinting any material appearing in this magazine please mention name of author, the magazine, and the Ohio Agricultural Experiment Station.

Spray compounds killing mites that cause

Maple Bladder Gall

R. B. NEISWANDER

Every year the Ohio Agricultural Experiment Station receives numerous inquiries regarding a gall-like growth appearing on the leaves of ornamental maple trees.

These are maple bladder galls and commonly occur on the leaves of many silver maples in Ohio. The galls are globular in shape and are located on the upper surface of the leaves. They vary somewhat in size, but the larger ones are approximately 1/10 of an inch in height. When first formed the galls may be pink or green in color, but they often become bright red and later almost black. Although they are most common on silver maple, similar galls somewhat smaller in size have been observed on red maple.

Caused by Mites

Maple bladder galls are caused by Eriophyid mites that measure approximately 1/125 of an inch in length. The mites live over winter in crevices of the bark of maple trees and crawl to the leaves when the new growth appears. They feed on the under surface of the leaves by means of sucking beaks and as a result of the injury galls develop on the upper surface. As a gall enlarges, a cavity forms with an opening on the lower surface of the leaf.

Maple bladder galls seldom injure maple trees severely, but they do reduce their ornamental value. For a number of years a dormant lime-sulfur spray has been suggested as a control measure for this pest. Although

such a spray has been known to kill the overwintering mites, it has not been wholly satisfactory because it discolors house paint when used near painted buildings.

Spraying Experiments

A series of spraying experiments was carried on in Lake County, Ohio during the spring of 1954 for the control of maple bladder galls on silver maple. By spraying after the buds were swollen but before new foliage appeared, a satisfactory degree of control was obtained with malathion and parathion as well as with liquid lime-sulfur. Malathion was used

at the rate of 4 pounds of 25 percent powder, and parathion at the rate of 2½ pounds of 15 percent powder in 100 gallons of water.

Some of the pouch galls that occur on the leaflets of wild cherry, wild plum, and ash are also caused by other species of Eriophyid mites. These galls are somewhat like the maple bladder galls but usually measure ¼ inch or more in height.

Cause Other Damage

Eriophyid mites sometimes occur in great numbers on walnut and hickory and have recently been observed on horse chestnut. On such trees they may not form galls, but they do cause a discoloration and may produce an abnormal growth such as a cupping of the leaflets. It is probable that when Eriophyid mites cause damage on shade trees the overwintering mites could be killed in the spring with one of the sprays mentioned for the control of the maple bladder gall mite.



This is a silver maple leaf on which Eriophyid mites have caused maple bladder galls.

DRYING GRAIN IS ANSWER TO HARVESTING

High Moisture Wheat

WILLIAM H. JOHNSON and HOMER T. HURST*

Farmers have been told for years to wait until moisture in grain is 14 percent or below before combining. This is based on the fact that high moisture grain is difficult to preserve in storage. Farmers must pay a price in order to harvest 14 percent grain. The crop stands in the field in a mature condition for almost a week before it becomes dry. Also, the normal harvest day is short. This fact tends to lengthen the harvest period.

Each day the crop stands in the field after maturity, more grain shattering takes place, secondary weed or legume growth is more troublesome, and the risk of lodged grain becomes greater. It is also a known fact that grain dried to 14 percent, then rewet and dried, shows a lower test weight. This not only causes grade reduction but has been proposed as a contributing factor in the development of "sick wheat."

Taking the grain from the field at the earliest possible date after maturity would seem desirable. One method to do this would be to harvest at a higher moisture content. Drying of the grain is essential. With the increase in farm or elevator drying facilities, however, this would prove to be no limitation to many farmers.

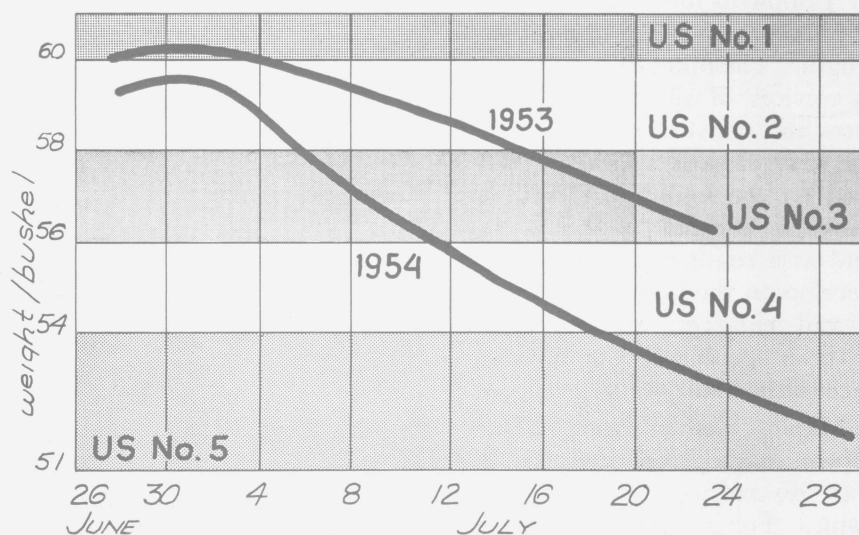
*Mr. Hurst, formerly a staff member of the Department of Agricultural Engineering, is now associated with Virginia Polytechnic Institute, Blackburg, Virginia.



Equipment such as this was used by Station agricultural engineers to evaluate the grain losses from the combine. Some combines vary in their ability to handle high moisture straw.

How feasible is early or high moisture combining? Will the machine work? What about machine losses? Can the grain be stored or dried effectively to preserve the potential quality of

POTENTIAL TEST WEIGHT



Note the drop in potential test weight per bushel as the harvest date advanced, also the corresponding decline in grain grade. This chart indicates it might be desirable to harvest before July 3.

the grain? These are a few questions which might be asked.

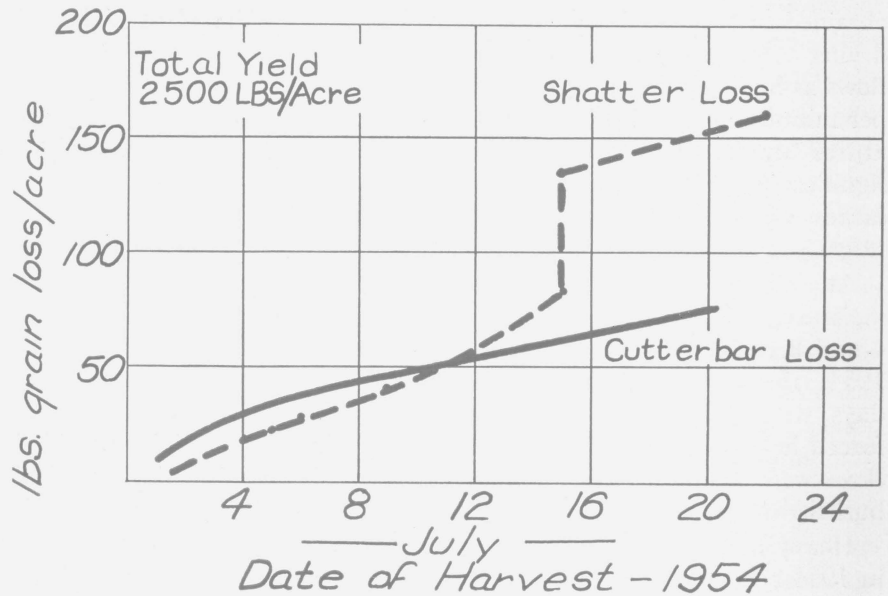
For the past two years the Station has been conducting research in cooperation with the Ohio Farm Electrification Council to answer some of these questions, particularly with the common soft red winter wheat varieties. Grain has been combined as high as 28 percent moisture. Tests were continued throughout the harvest season to determine grain losses and machine functioning.

A major challenge of the study was to preserve the highest possible quality of wheat coming from the combine at various stages of harvest. The grain has been dried through the use of either heated or unheated air. U. S. grade, germination, milling and baking tests are being made on the samples.

Combines vary somewhat in their ability to handle high moisture straw. In general, most combines will function well except where rain or dew is on the surfaces of the straw. Slightly higher than normal straw moisture content seem desirable for minimum rack or shoe loss so that the straw does not break up as much and the chaff tends to remain on the straw. The grain is much more difficult to thresh as moisture content increases; however, present combines have the necessary threshing ability.

Early harvest is quite desirable in minimizing cutterbar and shatter losses. For this year the first date at which grain tested 14 percent moisture was July 9. A storm on July 15 accounted for the extreme increase in the shatter loss.

Loss of grain from the combine is no higher and can be less at the slightly higher than normal harvesting moisture content of the crop if the cylinder is properly adjusted. The minimum grain



Shatter and cutterbar losses increase as the date of harvest is advanced. Grain tested 14 percent moisture on July 9. The extreme increase in shatter loss resulted from a storm on July 15.

loss per acre, including shatter loss, was found in the range of 18 to 20 percent grain moisture. Power requirements of the combine were observed to be higher as the grain moisture increased.

Germination of the grain will decrease as the moisture content at the time of threshing increases because of damage to the kernel. This reduction may become extreme where grain is threshed above 20 percent.

By cutting the standing grain, drying the grain in the head, and threshing when dry, a relationship of harvest date and test weight was found. From these tests it would seem quite desirable to harvest before July 3, since the grain for these two years on July 3 was in the range of 20 to 25 percent.

Unfortunately, when the grain was removed from the head before July 3, test weights were not



Agricultural engineers evaluated cutterbar loss by spot checking and counting fallen kernels.

obtained or preserved by present drying techniques. The use of air flows as high as 40 cfm (cubic feet per minute) per bushel or temperatures up to 150° F failed to significantly aid in obtaining highest test weights at the early harvest stage.

At and below 18 percent grain moisture, which occurred on July 4 and 8 respectively for 1953 and 1954, the test weights on those days were preserved with either forced heated or natural air. Air flows were as low as 3 to 4 cfm per bushel.

Heavy rust and scab infestation in 1954 accounted for the low test weights.

Much emphasis has been placed on test weight since the producer is paid on this basis. Milling and baking tests so far have not indicated any quality reduction for

the grain combined at high moisture content and dried by natural air or heated air up to 150° F.

When considering all the characteristics of high moisture wheat harvest, it would seem possible in practice to start the combine at 20 percent grain moisture. At this moisture content the shatter and cutterbar losses are relatively low; combine losses can be quite low and germination can be maintained high. Even though a slight drop in test weight would be expected in the drying of the grain, a satisfactory preservation of quality can be attained.

At 20 percent grain moisture, the cylinder-concave clearances on rasp and bar type cylinders will have to be adjusted at a near minimum, 3/16" to 1/4", for the high moisture harvest, and then be increased as the grain becomes

drier. A good rule of thumb is to check for unthreshed grain and adjust the cylinder-concave clearances or cylinder speed until about six grains per square foot are found in the head.

In drying the grain, it would seem that moderately high rates of air flow are desirable, probably from 3 to 8 cfm per bushel.

During a normal combine season, the combine can be started shortly after the dew is gone from the grain and run until the dew falls at night. In doing this, the combine day could be from 8 to 9 a. m. to 8 or 9 p. m. on a typical July day. Following a rain, the combine may be started at 20 percent grain moisture if the straw is free of surface water. Any grain harvested above 14 percent moisture should be dried.

ANTIBIOTICS

promote calf growth and help curb diseases

J. W. HIBBS, H. R. CONRAD and W. D. POUNDEN

The widespread use of antibiotics in animal feeds today is a good example of the rapidity with which feed manufacturers and livestock men are putting into practice the results of research carried out at the Ohio Agricultural Experiment Station and other research centers. Aureomycin has been used more extensively than the other antibiotics in calf experiments, although some work has been done involving the use of terramycin, streptomycin, bacitracin and penicillin.

There is general agreement that the feeding of from 10 to 100 mg. of aureomycin daily to calves 3 to

116 days of age will produce an increase in growth of from 10 to 40 percent over the untreated controls. However, considerable variation exists in the response obtained by various workers. Much of the apparent confusion that now exists stems from the fact that animal scientists do not know exactly what causes antibiotics to produce the growth response. It is encouraging, however, that the effects of certain factors on the growth response are helping to "pin point" the areas in which the mode(s) of action will be found.

Much of the available evidence indicates that the growth response

is brought about through the action of the antibiotics on the intestinal microorganisms. This helps explain the failure to obtain a response when animals were reared in a sanitary or sterile environment. The effect could be exerted in several ways: 1) by depressing the growth of intestinal organisms that compete with the host for various nutrients; 2) by eliminating known pathogens (disease-causing organisms); 3) by eliminating bacteria which produce toxins that interfere with growth; 4) by encouraging the growth of organisms that synthesize known or unidentified nutrients. Thus it is difficult to distinguish between the therapeutic effects and the nutrient effects in the growth response.

The increase in body size from feeding antibiotics has been found to be largely due to increased body fat and to a lesser extent to increased muscle and skeletal growth. It is accompanied by an increase in feed consumption and

an increase in feed efficiency. The degree of response appears to be influenced by certain dietary factors, the degree of exposure to infectious diseases, the level of antibiotic fed, and the age of the calves. The response is greatest in the first three to four months.

The results of an experiment conducted at Wooster in which aureomycin was fed to cud-inoculated calves fed various ratios of hay to grain will serve to illustrate the type of response which can result from aureomycin feeding. Three ratios of mixed hay to a simple grain concentrate mixture (4:1, 3:2, 2:3) were fed to calves 12 weeks of age. Twenty-four Jersey calves were included in this study. Aureomycin in the form of Aurofac 2A was fed in the milk at the rate of 15 mg. per day for the first 7 weeks during milk feeding and at the rate of 20 mg. per pound of dry feed ingested from the end of the seventh week to 12 weeks of age. From 12 weeks to 26 weeks the calves were fed either a 4:1 or 2:1 ratio of hay to grain.

Aureomycin increased growth in body weight and withers height, also stepped up feed intake and efficiency of feed utilization at all three hay to grain ratios. After 12 weeks, when the calves no longer were fed aureomycin, growth rate and efficiency of feed use dropped below the level of the controls so that no prolonged growth benefit resulted at either hay to grain ratio fed, 2:1 or 4:1. The percentage of dry matter, cellulose, and protein digested was not influenced by aureomycin feeding.

Less riboflavin was found in both rumen juice and urine when aureomycin was fed. Thiamine was not affected by aureomycin in either rumen juice or urine.

During the period from 8 to 12 weeks, blood sugar was main-

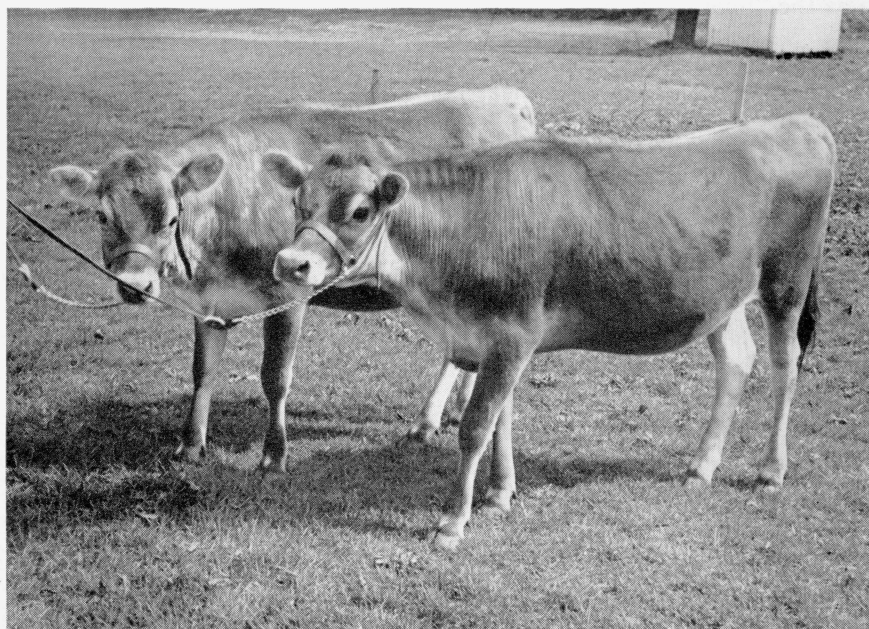
tained at a higher level in the aureomycin-fed groups than in the control group.

The finding that digestion of dry matter, cellulose, and protein was unaffected by aureomycin feeding shows that the increased growth resulted from some cause other than increased digestibility of the feed. The results of this experiment suggest that the primary cause, though involving the microflora of the rumen and lower digestive tract, may be closely associated with energy utilization and metabolism. This is especially indicated by the higher level of blood sugar, and the shift observed in the relative proportion of propionic and butyric acids in the rumen juice.

In conclusion it appears that under most conditions an increase in growth in calves will result from feeding aureomycin, terramycin and possibly other antibiotics up to about six months of

age. The response becomes less as the calves increase in age. The economic value of these increases in body size would depend upon whether or not the extra weight is to be marketed during this period and whether the extra gains would more than pay for the antibiotic used. In the case of herd replacements there is no particular advantage to be gained from the increased body weight since the differences in size do not persist until the age of first calving.

Thus, the principle advantage in feeding antibiotics to herd replacements would result from the control of certain calftail diseases, especially those involved in diarrhea and respiratory infections. The ultimate value of the use of antibiotics in the feeding of calves and other animals must await the results of further work on the mode(s) of action which may lead to hitherto unrecognized applications.



These calves raised at the Ohio Agricultural Experiment Station were fed aureomycin for the first 12 weeks. Tests show that benefits from antibiotics may be associated with energy use and metabolism.

Farm equipment available for adopting use of **Wide Corn Rows**

WILLIAM H. JOHNSON

There is a good variety of equipment available today which can be used directly or with slight modification to implement the wide row corn method as developed at the Ohio Station. Manufacturers have cooperated well in providing implements for this newer innovation.

Two major variations in the wide row system greatly alter the equipment demand. (A) The wide row is established between planted rows involving spreading of planters, cultivators, etc. (B) The wide row is perpendicular to the direction of the planting. In this case corn is planted in normal width rows; however, the distance between hills is the wide row dimension. This plan is referred to as the "long hill drop."

Wide Planted Rows

The wide dimension between planted rows presents the more involved problem. Nevertheless, the Station has considerable data to show that rows of 60 and 72 inches are quite feasible.

The 60 inch row is about the maximum possible width without taking considerable loss in yield of corn. (Tests show that the 70 inch spacing averaged 9 bushels of corn less than from 40 inch rows.) There are, however, few farm tractors or implements which will pass between such rows. For this reason it seems that the 60 inch row will be most satisfactory in those rotations which will allow the implements to work over the top of the row.

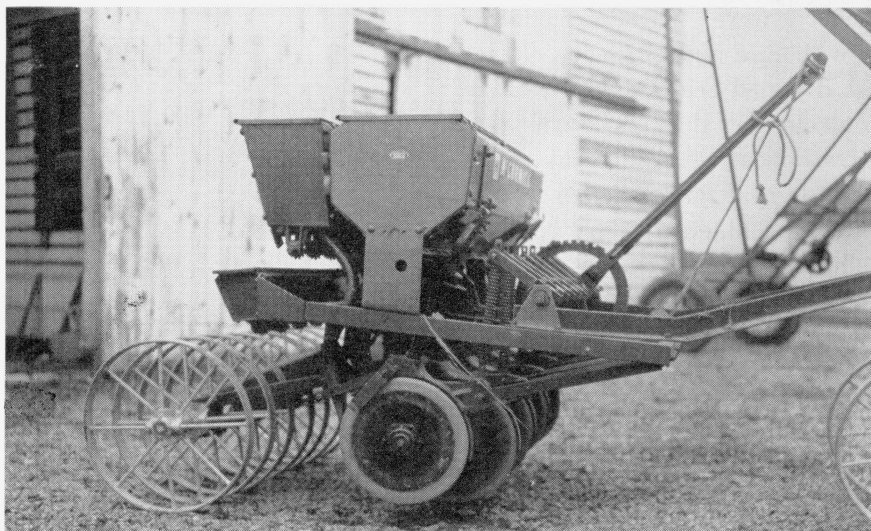
The 72 inch row will allow a wider variety of tractors and implements to pass between the rows. This spacing seems more desirable for those rotations which require equipment to pass between the rows.

By the very nature of this study, the author must mention in some cases the names of specific machines. In others, a general machine type such as found in most major line companies will be described. This list can never be considered complete, nor is it so intended. Omission of any certain name does not indicate lack of approval by the Station. Likewise, the mention of a name does not constitute a recommendation.

There are a few tractors which will pass between 60 inch rows, but these are quite small and not considered as common power units

on a corn belt farm. In order for the tractor to pass between 60 inch rows, the maximum width outside of tire to outside of tire is 52 inches. The following tractors will qualify: Farmall "Cub", Farmall "100", Massey-Harris "Pony", Massey Harris "Pacer", John Deere "40 Std.", Allis Chalmers "G", Allis Chalmers "B", Case "VAS", Oliver "OC3", Minneapolis-Moline "BG". The Case "VAS" and MM "BG" have hubs extending beyond 60 inches which will prevent the tractor from clearing the grown corn row.

The following tractors will pass between 72 inch rows. These units are divided into two groups—those with hubs extending beyond the tire and those with axles extending beyond the tire. The axle may prevent the tractor from clearing a grown corn row. Those having hubs which will not interfere with the row are: Farmall "100 HC", Allis Chalmers "CA", Case "VAO 15", Case "S", Oliver "OC3 Crawler", Oliver "Super 55", Caterpillar "D2", Ferguson, Ford, John Deere "40 Crawler", Minneapolis Moline "BF", Cockshutt "20", Willys "Jeep". Those having axles which extend beyond the 72 inch rows



At present a press wheel grain drill is available from some manufacturers for seeding wide row corn.



The machine pictured here is one of the first experimental type band seeding drills manufactured by the Brillion Iron Works. Components may be removed to allow adapting to various row widths.

will not interfere in the seeding of the grass crop. They are: Farmall "200", Farmall "300" and "400", John Deere "40 Tricycle", Case "VAC 14", Case "DC3 or 4", Case "SC 3 or 4". For either case the maximum allowable width outside of tire to outside of tire is 60 inches.

Almost any row-crop tractor will pass over two 60 inch rows. The same is true for 72 inch rows; however, special long rear axles will be required for some tractors. In case of the former, the maximum inside measurement between tires should be 72 inches. For 72 inch rows, this same dimension is 84 inches. Tractors of these types can be used in this manner for planting, cultivating and over-the-row interseeding of the meadow crop.

Tool Bar Equipment Valuable

Related field equipment must be considered in the wide row system. Equipment mounted on or centering around a tool bar seems most readily suitable for wide row

implementation. A tool bar is a horizontal square bar extending across the rear or front of the tractor. Lengths are available up to 112 inches and many accessories can be mounted on the bar.

Corn planters which are best suited for wide row are those mounted on a tool bar. In some cases the tool bar must be extended. To do this square stock is added to the end of the existing tool bar, the marker control rod extended and the marker lengthened. This is a simple modification any farmer could have done. A desirable feature of such planters is that each row assembly is an independent unit driven by its press wheel. Attention is called to cotton, beet, and bean planters in that they are more versatile in row width than conventional corn planters. Most manufacturers have these planters which are also suitable for corn. Most conventional 4-row corn planters can be adjusted to plant two 72 inch rows.

Generally, a conventional two-row cultivator can be used to cultivate 60-inch rows by proper selection of accessories which any dealer can supply. To cultivate 72-inch rows, it is usually necessary to adjust a 4-row tool bar type cultivator to do the work. The cultivator then becomes a two-row cultivator.

It seems likely that the 60 inch row will be most used for meadow seeding in corn. Either a grain drill or an inter-row grass seeder can be used.

The use of the grain drill involves the removal of disk assemblies over or near the row. For 60 inch rows the following grain drill sizes are suitable and found in most equipment lines: 20-6, 9-7, 17-7, 18-7, 8-8, and 16-8. A band seeding attachment for the drill is quite desirable for this type of seeding. A small plow press wheel drill can be used to make this seeding if grass seed attachments are available.

An inter-row grass seeder for either 60 or 80-inch rows is available from the Brillion Iron Works. This is primarily a broadcast seeder without any provision for fertilizer application.

Mowing May Be Necessary

Under some conditions it may be necessary to mow between the rows. Severe weed growth may jeopardize the new seeding or it may be desirable to limit the inter-crop growth through the use of a mower.

It seems that the rotary mower has the most possibilities now; however, the 60-inch row is again quite restrictive. Wood Bros. Mfg. Co. has a 42-inch, Model 42C, available for mounting on a Farm-all "Cub". The C. W. Mott Co. has a 48-inch mower available.

For the inter-seeding of wheat, the 72-inch row is more desirable considering the number and types of operations required. The planting demands an inter-row grain drill. At present, the small plow press wheel drill is available for either 60 or 72 inch rows, although not all companies have a fertilizer or grass seed attachment available for this drill. The International Harvester Company does have such a drill available.

Rear mounted field cultivators provide an excellent tool for inter-row soil preparation. The frame may have to be reduced in length, but this is a simple modification. Most companies have this type of equipment available. Small 48 inch disk harrows are also available for most small tractors.

The method of planting in conventional width rows, dropping the hill approximately 60 inches on center, involves the alteration of fewer machines. This system is limited to an inter-seeding of grass or legume crops, which in itself simplifies the equipment requirement. Since this plan is new, much less work has been done from the engineering standpoint.



The principle of wide row corn and the interest by manufacturers in building new equipment will enable Ohio farmers to sow wheat in standing corn at the customary fly-free date.

The corn planter must be the type that will drop 6 kernels in hills 56 to 64 inches apart to obtain desirable seeding rates. Many companies have had, and some still have, hill planters of this type. It does not seem feasible to deposit more than six kernels per hill without altering the gear ratio between the seed shaft and the seed plate drive. This is an alteration which must be left up to the manufacturer at the present time.

Most conventional hill drop planters now in production use a 16 cell seed plate and drop up to 4 kernels per revolution of the seed shaft. In order for these planters to drop 6 kernels per hill a 24 cell plate is required. This means that for each revolution of the seed shaft 6 kernels are deposited. Not all companies offer a 24 cell plate; however blank plates are available which might be ground to make the 24 cell plate. The planter must also utilize a single hill drop striker (or cam), which deposits one hill per revolution of the seed shaft. Various hill spacings can be obtained by proper

selection of sprockets on the main drive. Additional sprockets may have to be supplied.

The John Deere 999 planter is one of the older planters which needs no modification to drop 6 kernels per hill. A 24 cell seed plate is available. Many of these planters are still found on the farm even though it is not in current production. Sprockets on the planter are suitable for 56, 56.6, and 64.5 inch spacings.

The John Deere 246 planter is also suitable with the 24 cell plate. A single hill striker must be used on this planter instead of the double striker provided. Spacings of 56 and 64 inches are possible with the sprockets provided.

International Harvester Company also offers a 24 cell plate. In most of the IHC planters additional sprockets must be supplied to obtain the long hill drop.

The grass inter-seeding is made in the conventionally spaced row and can be done with a grain drill much the same as in 60 or 72 inch

(Continued on page 49)

Chlordane applications help reduce damage to BENT GRASS

J. B. POLIVKA

The use of chlordane for the control of webworms and cutworms in golf course greens presents a problem to many golf course superintendents in Ohio. Since the general practice is an application of 1.5 pounds of technical chlordane per acre 2 to 4 times a year, the question has arisen as to whether or not continued applications at this rate would eventually result in an accumulation of chlordane in the soil and a possible ill effect upon grass growth.

Three Treatments Used

In order to get an answer to this question, an experiment was established on a plot of Old Orchard bentgrass at the Ohio Agricultural Experiment Station. Treatment consisted of chlordane at the rate of 100, 10, and 1.5 pounds of technical material per acre and the effect of these treatments on grass growth and insect injury was measured.

The bentgrass block was divided into 24 plots. Each plot was 5 feet wide and 31 feet long. All of the above treatments including an untreated check were replicated six times. The 100 and 10 pound rates were applied as wettable powders mixed with milorganite and distributed with a small fertilizer spreader on March 17, 1954. The 1.5 rate was applied as an emulsifiable concentrate with a two wheel push type sprayer on May 17 and repeated on June 19, and July 19.

Clipping records were taken three times a week from May 19 to September 9. Grass obtained from one swath with a 21-inch self propelled power greens mower along the mid-section of each plot was taken for the yield records. The area sampled for yield was therefore 21 inches wide and 31 feet long in each plot.

Bird Feeding Noted

On July 19 a large number of birds, mostly starlings, were found making holes in the turf with their beaks and were apparently feeding on insects in the grass. It was noted also that the feeding in the bentgrass block was heavier in some areas than in others. A preliminary survey indicated that these feeding areas were clearly defined by the plot lines. In order to have some basis for comparison, the extent of the feeding was differentiated in four categories: high, medium, low, and none.

Daily Records Taken

The different categories were based upon the estimated number of feeding punctures observed per square foot of surface area. High feeding was indicated when it was estimated that there were more than four feeding punctures per square foot; medium feeding by two to four punctures per square foot; low feeding by one to two punctures per square foot; and none when no feeding punctures

were present or when it was difficult to find them. Bird feeding puncture records were taken daily from July 19 to August 27, 1954.

When the bird feeding records were summarized and analyzed, it was found that there was significantly less feeding on the plots treated at the 100 pound rate than on any of the other treatments. There was also less feeding on the 10 and 1.5 pound treatments than on the untreated areas.

Findings Summarized

When the clipping records were summarized, it was found that on an acre basis 2.5 tons of grass was taken off of the untreated area, 2.8 tons from the 1.5 pound treatment, 3.1 tons from the 10 pound treatment, and 3.0 tons from the 100 pound treatment. A statistical analysis of these records showed that the amount of grass taken from the untreated plots was significantly less than that taken from any of the treated plots although there was no difference between the chlordane treatments.

No Damaging Effect

These findings are contrary to what was anticipated. It was expected that the heavy applications of chlordane might retard grass growth and reduce the amount of grass obtained from clippings. It was also expected that chlordane applications made early in the year would have little effect if any upon the webworm and cutworm populations in the turf in the fall. These findings indicate that it is possible to improve turf areas by applying insecticides to control some of the pests that apparently account for the thinning out of the grasses. The results also indicate that there is little likelihood that repeated applications of low dosages of chlordane will have any damaging effect on the growth of bentgrass.

Honey bees are effective in pollination of **RED CLOVER**

W. E. DUNHAM

Bumble bees have long been associated with the pollination of red clover and many people believe that bumble bees are the only effective pollinating insect on red clover. Contrary to this general belief, honey bees work red clover bloom and represent the only insect in sufficient numbers to insure blossom coverage that can result in profitable seed production.

Research on red clover in Ohio over the past 25 years has resulted in an accumulation of much valuable data on the relative performance of native insects and honey bees. All research was conducted during the second blooming period of red clover which represents the stands that are managed for seed production. Champaign, Franklin, Henry, Madison, Marion, Pickaway and Wyandot counties comprised the areas where research was conducted.

Blossom Coverage by Native Insects

Approximately 38,000 square yards of red clover bloom were surveyed to determine the types and relative abundance of native pollinating insects. Bumble bees and solitary bees represented by far the most important insects in this group. Blossom coverage by native insects showed a negligible role. The actual blossom coverage ranged from two to seven percent.

Data for 1930, 31, 32 and 1948 were collected while the author was on duty with the United States Department of Agriculture and made available through its courtesy.

Another important aspect showed that the native insect population has remained rather static and there is no encouraging aspect that would seem to warrant any future change in the situation.

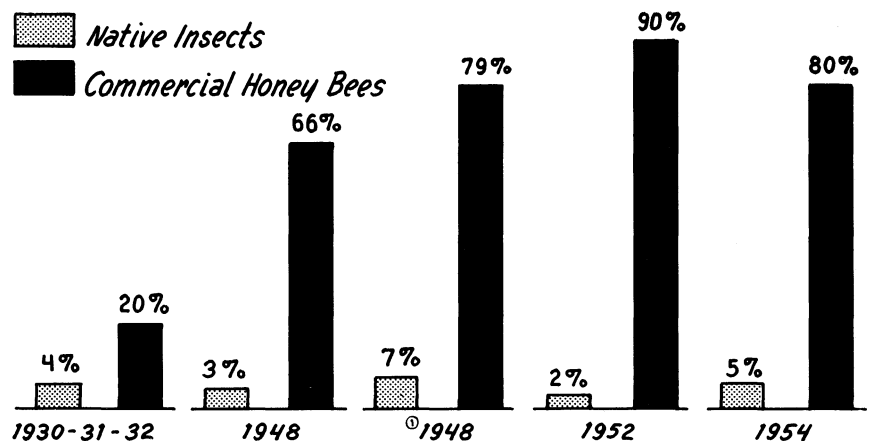
Honey Bee Blossom Coverage

Honey bee coverage on red clover bloom was based on sampling 17,230 square yards. Research studies reveal that honey bees work red clover bloom, that honey bees represent the only insect group where economic blossom coverage occurs and that there are times when the bloom is especially attractive with honey bees furnishing full blossom coverage. The graph in 1948 showing 79 percent blossom coverage by honey bees represented a mammoth red clover field which shows, along with other experimental data collected, that honey bees work mammoth red clover fields industriously.

The fields selected for studies had commercial yards of bees bordering them or not more than one mile distant. The obvious question that should arise when studying the chart is, why should honey bee activity be more intense during the late forties and fifties than in the early thirties when the coverage was rather low?

Explanation of More Honey Bee Activity

Since the early thirties, farmers have become increasingly more conscious of research findings showing that early legume cuttings contain the highest protein, and as a result the cutting of legumes at the beginning of the blooming stage has now become a general practice. Increased mechanization and more rapid hay harvesting equipment has meant a shorter blooming period and in many cases there is no period when the bloom is available for bees to gather food. Also during the thirties more late white sweet clover was used in the farm program and more sweet clover was present in waste lands. The present use of herbicides also eliminates much bee forage that might otherwise be available.



Comparisons in this chart are based on 100 percent blossom coverage with 4,840 honey bees per acre or an average of one bee for each square yard. Mammoth red clover was used in 1948.

While the legume acreage for green manure and forage has increased over the years, the actual acreage of bloom for bee forage has decreased. In the absence of other attractive blooming plants, honey bees will work red clover intensively. Red clover pollen is easily accessible for bees and in visiting flowers for pollen, honey bees perform the important

function of cross-pollination. Although red clover is a heavy yielder of nectar, it is often inaccessible to bees because of the depth of the corolla tubes. When conditions are favorable for nectar secretion there is an actual accumulation of nectar in the corolla tubes until the level may rise sufficiently so the bees are able to reach a portion of it.

During the blooming period of red clover there are often frequent intervals when honey bees work the bloom for nectar, although they rarely get enough for the storage of any surplus. Honey bees must first "trip" the red clover corolla before they can reach the nectar. Thus, nectar gatherers are as effective as pollen collectors in the cross-pollination of red clover.

Study further progress of chemicals for

THINNING APPLES

C. W. ELLENWOOD and FREEMAN S. HOWLETT

Experimental work in the use of chemicals to thin apples continues to be an important Horticultural Department project.

In the March-April, 1952 issue of Farm and Home Research, results of the 1950 and 1951 tests were presented.

This report will be based principally on the results obtained by this Station in 1952, 1953 and 1954.

The use of some type of chemical for thinning apples is now quite generally followed as a regular practice by many Ohio fruit growers. Other growers have used chemicals for thinning occasionally.

Method Has Hazards

The Ohio Station has never urged the universal adoption of the practice. The hazard of over-thinning is generally recognized. However, chemical thinning is frequently the only tool available in the larger acreages if any degree of thinning is to be accomplished. Shortage of labor supply and the

attendant cost have almost eliminated the practice of hand thinning.

The size of fruit at harvest time is closely related to the number of fruits which set and grow. Of

course pruning, moisture supply, and fertilizer treatments are all factors in determining the size of fruits.

Two Objectives

The two main objectives in thinning are: (1) To reduce the number of fruits sufficiently to permit the remaining fruits to attain satisfactory size; and (2) To encourage annual production. The elimination of limb breakage is an added advantage of thinning.

Early season thinning is more conducive to influencing annual production than hand thinning in June or later.

Variety	Materials	Dilution per 100 gallons	When to apply
Yellow Transparent	Elgetol	1½ pints	Full Bloom
Wealthy	D.N. 1	16 ounces	Full Bloom
Duchess	D.N. 1	16 ounces	Full Bloom
Grimes Golden	Elgetol	¾ to 1 pint	Full Bloom
	D.N. 1	10 ounces	Full Bloom
Golden Delicious	N.A.A.	15 to 20 ppm	Within 1 wk. after petal fall
	N.A.M.	50 to 62½ ppm	Within 1 wk. after petal fall
Rome Beauty	Elgetol	¾ pint	Full Bloom
	D.N. 1	10 ounces	Full Bloom
	N.A.A.	15 ppm	Within 1 wk. after petal fall
	N.A.M.	50 to 62½ ppm	Within 1 wk. after petal fall
Jonathan	N.A.A.	15 ppm	Within 1 wk. after petal fall
	N.A.M.	50 to 62½ ppm	Within 1 wk. after petal fall

Chemical thinning is done either at full bloom time or within seven days after petal fall. Since thinning chemicals are frequently applied before the danger of frost is passed, their use is not suggested for sites known to be especially subject to spring frost damage.

There are two types of chemicals used for thinning: (1) Caustic, such as the dinitro compounds including Elgetol, Krenite and D. N. 1; and (2) the hormone or growth promoting materials such as naphthaleneacetic acid (N.A.A.) and naphthylacetamide (N.A.M.). The caustic materials are applied as the trees approach full bloom and the hormones within seven days after petal fall.

The caustic materials are suggested only for sites where the frost hazard is known to be very low. Growers generally prefer the use of the hormone materials. It should be noted that some damage to foliage may result from the use of the caustic materials as well as from some of the hormones, although this damage is generally not serious. Trees of good vigor quickly recover from the damage incident to the use of caustic materials. The distortion of the foliage sometimes resulting from the application of hormone thinning sprays may be apparent all season. The actual damage is generally not serious. However, it is because of this foliage injury following the use of the naphthaleneacetic acid base materials, that the use of the naphthylacetamide has been suggested. Experimental results in 1953 and 1954 have shown that this latter type of thinning agent is promising.

The grower who uses chemicals for thinning needs to give careful thought to weather conditions at the season when thinning is done. This refers to the conditions at bloom time and for the predicted weather for at least two weeks following. Some of the weather

conditions and growth factors to be considered are:

(1) The date of bloom of a given variety. If this occurs at the average time or later, then thinning is more desirable than in the case of an early bloom.

(2) Conditions for pollination at bloom time as they affect bee flight and good pollination needs to be considered. Two or three bright sunny days with temperatures above 60° F at bloom time is desirable.

(3) Growing conditions for the two-week period beginning with petal fall. Growth conditions during this period are factors in the degree of fertilization of the flowers following pollination.

All of these factors are matters for local consideration, and each grower will have to evaluate them for himself. Government weather predictions are especially important at this season.

Variety Considerations

Some varieties tend to set more fruit in relationship to the amount of bloom than others. These differences in variety characteristics need to be considered by the grower. Such varieties as Yellow Transparent, Duchess, Wealthy, Grimes, Jonathan, Golden Delicious and Rome Beauty have a tendency to set a higher percentage of the flowers than Delicious and Stayman. The varieties with tendencies to set heavy crops should be given first consideration in planning a thinning schedule. Annual and regular production can be encouraged by means of chemical thinning. This is especially true of Yellow Transparent, Wealthy, Grimes Golden, Jonathan and Golden Delicious.

Some observations have been made on the number of flowers necessary for an adequate crop. In determining the effectiveness of the various thinning experimental trials, a count of the number of

blossoms is made at the time of application. The number of fruits after the June drop is over is also noted.

During the years 1952, 1953 and 1954, Red Rome on unthinned trees set an average of 14 percent of the original flowers. In order to obtain adequate thinning, the number of fruits should have been seven percent of the flowers. For the 3 years, the range of set on the unthinned trees was from 9 to 17.5 percent. For satisfactory thinning, the range was from 5 to 10 percent set. In the case of Jonathan, the unthinned trees set from 4 to 48 percent of the flowers and the desired degree of thinning for these three years ranged from 3 to 10 percent depending upon the year and the orchard. The amount of thinning required depends upon several factors including the type of pruning. On trees which have been given detailed pruning, the thinning requirements are less than on denser trees.

The limited number of tests conducted by the Station indicates that the concentrate sprayer is not satisfactory for the application of thinning materials. This is especially true in the case of the naphthaleneacetic compounds. At present the use of concentrate sprayers for this purpose is not suggested.

Suggestions for Chemical Thinning

Based on the results of experimental trials in recent past years, the following suggestions are made. We emphasize that due consideration should be given to: (1) the site of the orchard as to its susceptibility to frost damage; and (2) to the date when full bloom is reached in any given year. Growers who follow these suggestions are justified in incorporating thinning into their regular orchard program.

FARM FAMILY

survey shows need of assistance to homemakers

CHRISTINE H. HILLMAN

Figures reported in a number of recently published research studies give emphasis to the statement that "farm boys are increasingly marrying non-farm girls." Reference is, of course, to young men born and reared on farms and who intend to make farming a life-time career.

An analysis of data included in a study of 150 young married Ohio farm families show that 39 percent of wives interviewed had non-farm backgrounds.¹ A considerable number indicated that they had not so much as visited a farm prior to marriage.

Relative to these findings, questions frequently arise as to why the trend toward the selection of a mate outside of the rural community? What do the figures mean in terms of marital adjustment and successful farm family living, and especially the implications for professional persons and/or organizations working with young couples in rural communities?

Figures Not Surprising

Significant as the above figures may be, they are not necessarily surprising. Rural populations traditionally have been known for their high sex ratios. In other words, one expects to find more males than females in any given farm population. An examination of the U. S. Census reports for the

last four decades shows, for example, not only more boys than girls born in rural communities but more boys remaining in rural communities as they grow to manhood. Research indicates, also, that more farm reared boys than girls want to remain on farms.

Farm girls more than farm young men leave high school to enter college or for preparation in an urban occupation. This removes from the farm community many eligible marriage partners. In Ohio at the time of the 1950 Census there were approximately 119 males for every 100 females between the ages of 20-24 years of age in the rural farm population.² It is during this age period when normally most young men are thinking of marriage.

Other Factors Involved

Other factors, however, enter into the rural-urban type marriage. Young farm men today are more frequently (1) participating in urban-centered social, recreational, and service organizations, (2) attending schools and colleges in urban communities, (3) spending periods of time in military service, and (4) taking off-farm jobs to supplement farm income or to acquire needed capital with which to become better established in farming. Through any of these contacts it is possible to meet young women of mar-

riageable age and interest. With sex attraction a fairly constant factor it is inevitable, perhaps, that two may be drawn together in friendship with marriage a frequent result. At this point, it is highly possible that the young man does not consider the urban background of his mate as being a deterrent to success in marriage nor does it follow that it should be so.

In any marriage there are adjustments to be made. In instances of the rural boy and the urban girl marriage, it may simply mean that the number of areas wherein adjustments are necessary will be increased and more prolonged than they might otherwise have been.

Frederic Le Play a century ago proposed the thesis that the individualistic values fostered by urbanization in contrast with the traditional rural family interests and values associated with home, children, and husband-wife loyalty, were causes of unhappiness and disintegration of rural homes wherein the wife had been reared in an urban community.³ Furthermore, he stated that it would be difficult for the marriage partners to ever reconcile their differences since the social heritage of most farmers include values, standards, and interests associated with the occupation of

¹Ohio Agricultural Experiment Station, Bulletin 750. September 1954. "Factors Influencing the Lives of a Group of Young Farm Families."

²Andrews, Wade H. and Snow, Lorenzo H. Ohio Agricultural Experiment Station, "Comparative Population, Agricultural and Industrial Data for Ohio Counties, 1940-1950."

³Le Play, Frederic, "Les ouvriers europeens," 1st. ed. Paris, 1855, 2nd. ed., 6 vols. Paris, 1878, translated, abridged and summarized in Zimmerman, Carle C. and Frampton, Merle E., **Family and Society**, Van Nostrand, New York, 1935, pp. 402-468.



Young rural homemakers with urban backgrounds realize there is a need for better understanding of family living and social adjustments in the community. The two Wayne County couples studying such problems are: (left to right) C. B. Geiser, Jr., Thomas Silver, Mrs. Geiser, and Mrs. Silver.

farming and the rural way of life in contrast to that of the city where a multiplicity of values and standards exist, a diversity of occupational activities may be engaged in among family members, and a traditional way of life is not clearly defined.

Rural Living Changed

Great are the differences, however, between farming and farm family living at the time of M. Le Play's writing and rural life in the United States at present. The growing urbanization of agriculture, the utilization of labor-saving devices and conveniences in the home, modern transportation and communication, the shift from the family working together as a unit to the dispersion of children to the city for education and non-farm jobs, the decrease in the attachment to land and in loyalty to the rural way of life, the tendency on the part of many urban folk to seek rural residence; all have profoundly changed not

only the rural community and the farm but rural family living as well.

At the time of M. Le Play's treatise, it is possible that his observations were entirely correct. It is possible, also, that they may be accurate predictions for some present day marriages. It appears, however, that with modern couples of mixed rural-urban backgrounds, it is not so much a question of conflict between individualistic values fostered by urbanization and the familism, values, and standards associated with rural life as it is the need for a clear understanding of the close association between farming and certain patterns of family living, and the ability of the urban person to adapt to the specific pattern. Materials relative to ways by which one might acquire a better understanding of these and knowledge relative to different types of adjustment problems to be expected are limited. Significant for research, it seems,

might be a study of successful and unsuccessful attempts to combine urban and rural prototypes of family living within a given family.

Adjustment Necessary

Naturally the success or failure of any marriage depends upon how a situation is dealt with by the particular couple. Emotional maturity, a conscious recognition of the need for working at building a happy relationship, self-discipline, a willingness to share, ability to compromise; all are necessary ingredients of successful marital adjustment whether one lives in the city or in the country. On the basis of available research it appears, however, that these in combination are not enough to guarantee complete adjustment to farm family living insofar as the urban girl is concerned. Her adaptation is not only to marriage in and of itself, but to a completely new physical, social, and economical environment as well. The

manner in which she accepts this affects the whole marriage relationship.

In the study of 150 young married Ohio farm couples (referred to previously), women of urban backgrounds rarely indicated serious personality clashes, opposing philosophies of life, divergent standards or values between husband and wife as major factors affecting the early years of their marriage. They referred with greater frequency to their difficulty in adjusting to (1) uneven and long hours of husband's work necessitated by farming and the management of a home where a planned program of work or a schedule appeared to be impossible due to these hours, (2) the management of a home wherein there were so many responsibilities for which they were untrained, (3) the management of an irregular cash income and insecurities associated with the farm income, (4) lack of social contacts especially with young women of similar age and the resultant loneliness, (5) lack of recreational or social outlets for young couples in rural communities planned at a time when it was possible to attend, and (6) the slowness by which many rural families appeared to accept the urban girl in her newly adopted community.

Trend May Increase

These statements have significance for all who are concerned with the success of modern marriages, for parents of these couples, and for persons professionally interested in rural organizational program planning. It is unlikely that farm boys who choose urban brides will decrease in number. If anything, it is possible that their number will increase. To help many young couples attain satisfactory marital adjustment may require, therefore, the ener-

gies and the interests of many residents in a community and the need for these energies and interests to be woven into a system of common relationships.

The young husband should be aware of his wife's need for social contacts and social satisfactions to be gained by neighborhood and community relationships. Ideally, he and his family should acquaint her with the various organizations in rural communities wherein she may make friends of her own age and encourage her to actively participate in them. Someone should take the initiative in introducing her to opportunities afforded through the Agricultural Extension Service and especially the Home Demonstration Agent from whom she may get answers to many baffling homemaking problems. In this connection, some one should assume responsibility for seeing that she attends "home-maker" meetings and personally see that she gets to them. Figures indicate that one of the reasons why many fail to attend such meetings is because they "don't know anyone and hesitate to go alone."

Acceptance Helps

Certain programs each year might be devoted to a study of specific homemaking problems of the young woman with the urban background. Furthermore, older members might watch for opportunities to delegate some club responsibilities to her. This gesture is frequently interpreted as acceptance by the group and will help the young woman feel that she has new-found friends.

The Extension Service, the Farm Bureau, the Grange, and other farm organizations are encouraging "young couple" participation in group activity more than ever before. This will, undoubtedly, help answer the need for greater social and recreational

contacts on the part of all young farm families. Data relative to the study of young married couples in Ohio indicate that, insofar as the young wife of urban background is concerned, any educational program or activity which serves (1) to meet specific needs for information relative to farm and home living, (2) to develop confidence in her abilities, and (3) to provide opportunities for member participation and the feeling of acceptance by the group, will go far in helping her not only to a more satisfying personal life but shorten the period of marital adjustment as well.



WIDE CORN ROWS

(Continued from page 42)

rows. In the 40 inch conventional row width the following grain drill sizes will work: 20-6, 14-6, 18-7, 12-7, 10-8, and 16-8.

The Ohio Station believes the "long hill drop" will be particularly useful in establishing summer seeded crops since it will permit more light to fall on the young grass or legume seedlings. At the same time, it is a system quite adapted to the standard planting, seeding and harvesting equipment now in use. It must be remembered, however, that this plan is still in the experimental stage.

In view of the interest already noted from manufacturers and the fact that considerable equipment is already available, it appears that the future of wide row equipment development looks good. Naturally, a most desirable plan is to have equipment specifically for wide row culture. Where that is lacking, a farmer will have to modify his existing tools to the best advantage.

**Conservation practices may
see wider use on**

DAIRY FARMS

R. H. BLOSSER

Practices that conserve or increase the productivity of a farm have received considerable emphasis during the last two decades. As a result, many farmers ask the question, "Will these practices pay and how much?" Usually this question is difficult to answer because profits from farming by any system of management depend on a number of factors. Some of the most important ones are: (1) soil type, (2) type of farming, (3) number and kind of improved practices used, (4) relative prices of crops and livestock, and (5) the efficiency of forage consuming animals.

A recent study by the Department of Agricultural Economics and Rural Sociology on 55 southeastern Ohio farms has given some answers to the above question. Soils on these farms are Muskingum and associated types which cover about one-half of southeastern Ohio. They are usually steep with slopes ranging from 10 to 30 percent. Erosion is a serious problem on most of the cropland. In many cases one-half to three-fourths of the original top soil has been lost because of improper land management in the past.

Farm Size Varies

Information was collected first on farms having soil depleting and soil conserving systems of farming. Since these two groups of farms differed in size and production efficiency, it was impossible to compare actual income figures and

"Conservation Farming" may be defined herein as a combination of practices to maintain or improve the tilth and mineral content of soils. In contrast to research in crops where actual yields are checked after the application of any or all of these measures, agricultural economists combine actual results from representative farms with their own calculated results. These assumptions are based on average yields and enable the writer to project the theoretical benefits of conservation practices over a period of years.

These results and calculations then attempt to answer the question of whether conservation practices pay. The author makes no claim that they are the absolute answer but has offered them as a partial solution to the problem of where the practices cease to be profitable.

tell exactly how much soil conserving practices increased net income. Therefore, net income for both types of farming was calculated for a 120 acre dairy farm using crop yields obtained from the farms surveyed. Everything was kept the same except the amount of conservation practices applied. This method of figuring showed differences in income that could be attributed only to the additional crops produced under conservation farming.

Conservation farming gave \$490 more net income than soil depleting farming when no additional labor and capital were used. If all forage were fed to 5,000 pound dairy cows, conservation farming would give \$300 more net

income after hiring the additional labor needed. With 9,000 pound cows profits from conservation farming would increase to \$765.

Crop production for both types of farming was estimated from 12 acres of corn, 14 acres of wheat, 34 acres of meadow, 36 acres of permanent pasture, and 24 acres of woods and miscellaneous. By using contour strip cropping to control erosion, no reduction would be needed in grain crops for conservation farming.

Average Prices Used

Crop yields for soil depleting farming were 46 bushels per acre for corn, 22 for wheat, and 1.2 tons per acre for hay. Conservation farming gave 68 bushels per acre for corn, 26 for wheat, and 2.5 tons per acre for hay. Average prices for 1943-1952 were used to give a truer picture of price relationships.

In this study, soil depleting farming included red clover and timothy meadows, no contour strip cropping, inadequate applications of lime and fertilizer on the cropland and no permanent pasture improvement. Soil conserving farming included alfalfa-grass meadows, contour strip cropping and liberal applications of lime and fertilizer on the cropland and permanent pasture.

Calculations were made for a one-man dairy farm of 120 acres because this type of farming prevailed in the area studied. Dairy cows provided a dependable market for forage and sufficient volume of business to use all available labor.

On many farms conservation farming requires more labor and capital than depleting farming if all crops are harvested. One example of added labor and capital costs would be harvesting more hay and feeding it to more dairy cows. However, some farmers may not be able to increase their

labor supply. Calculations in this study showed that with no additional labor and capital conservation farming would increase net income about \$490 above soil depleting farming. Most of this increase would come from raising more bushels of grain and feeding it to hogs. Under soil depleting farming the farmer would have enough of his own labor to harvest and feed all of the available forage. But under conserving farming he would have only enough of his own labor to harvest and feed about two-thirds of the forage produced.

Requires More Labor

Further calculations showed that when all forage was fed to dairy cows, conservation farming would require about one-third more labor and one-fifth more capital than soil depleting farming. If this additional labor were hired and forage were fed to cows producing 5,000 pounds of milk for sale, net income from conserving farming would be only \$300 higher than depleting farming. This calculated increase in net income was less than when no labor was hired and the additional forage plowed under. With this type of cow the farmer could not afford to hire labor to feed all forage produced under conservation farming. He would receive only \$.40 an hour for labor that cost \$.60.

When all forage was fed to cows averaging 9,000 pounds of milk for sale, conservation farming would increase net income about \$765 after paying for the additional labor required. With this type of cow the farmer could afford to hire additional labor to use all of the forage produced under conservation farming. This level of milk production would give about \$.95 an hour for labor that cost only \$.60.

These figures show the importance of livestock efficiency in

making conservation farming pay when the additional forage is fed to dairy cows. In hilly areas where the acreage of grain is small, profits from conservation farming will depend largely on how the hay and pasture crops are used.

Income May Be Smaller

We gave no consideration in this study to the economics of conservation farming during the transition period. On many farms it may take several years to reach the maximum net income once conservation practices are adopted. During this interim period, current operating expenses may increase more than gross receipts and thereby reduce net income.

This study does not indicate the economics of conservation farming for different size farms. Larger farms should provide a more efficient use of machinery and overhead items than smaller farms. Farms of more than 120 acres, operated with the labor of only one man could often produce a

higher net income and return per hour of labor because more corn could be raised. However, the farmer would need more capital. Likewise, farms of less than 120 acres operated with the labor of only one man may produce less net income and lower return per hour of labor because of smaller corn acreage. These conclusions would be true under conditions where corn returned more per hour of labor than forage crops.

Conservation Effects

This study has not considered the long-time effects from conservation farming. Comparing the cumulative effects of soil conserving and soil depleting practices would require more data on crop yields and forecasts of future prices.

Conservation farming also involves the factor of maintaining the productivity of the land for future generations. Although this may not concern many farmers, it deserves careful consideration in our general agricultural policies.



Contour strip cropping shown on this farm is visible evidence that some conservation practices have been adopted.

Two Methods of Tree Removal

C. W. ELLENWOOD

and

JOHN T. YODER, Jr.

In the fall of 1954 it became necessary to remove one of the Station apple orchards which had been planted in 1922. Its value for research work had ended and the area was needed for planting trees resulting from the apple breeding project.

Dynamite Used

Dynamite was used to blow out or loosen up the trees so they could be easily removed. Two methods of removal were followed:

A. In one section of the orchard the dynamite was exploded under the standing trees before any of the top had been removed.

B. In another area the main scaffold limbs were removed prior to the dynamiting.

Costs Compared

The time consumed in the several operations incident to the removal was recorded. Cost for removing the trees, burning the brush, and preparing the limbs for buzzing in Method B was \$5.00 per tree, whereas that of A was \$5.29. This represented a saving of 29 cents per tree by sawing off the main branches before dynamiting. Trees removed by the first method required 3.5 lbs. of dynamite, while those with tops removed required 2.7 lbs. each.

Firewood Salvaged

Fifty-four ricks of firewood (8 ft. long, 4 ft. high and 20 inches wide) were salvaged from the 113



The Station photographer snapped this picture just as the 2.7 pound charge of dynamite was being set off. Top and lateral branches had previously been removed.



This is how one of the 32 year-old apple trees looked after being dynamited. In this instance the charge was exploded under the standing tree before any of the top had been cut off.

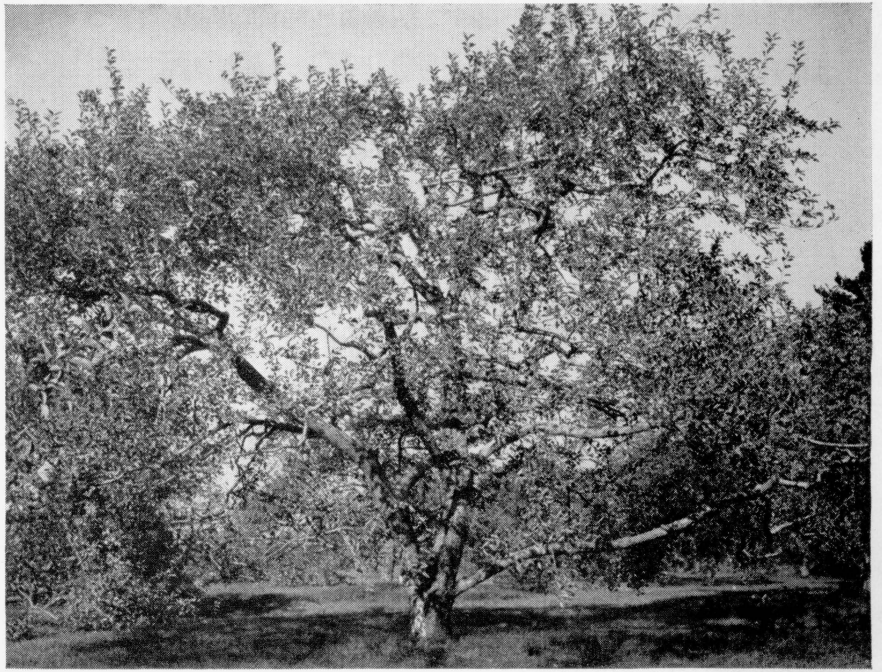
trees. This cord wood sold at \$6.00 per rick delivered. For the purpose of this presentation, the wood is valued at \$4.00 per rick at the orchard. When the value of the wood is deducted from the removal charges, the average cost of removal for the 113 trees was \$4.28 per tree or \$110.45 per acre for the 4.4 acres.

Seems Expensive

These methods of removing trees may seem rather expensive. In this instance it was necessary to refit the site for replanting as quickly as possible. After the trees were removed, the site was plowed and leveled and then immediately set to trees. The original orchard was planted in rows 38 feet apart with a line of tile midway between each row. The rows of the new orchard are 19 feet apart and the planting arrangement avoids both the original tree location and the tile. It was believed that the dynamiting incident to tree removal would serve to aerate the soil and improve its physical structure.

Soil Easily Removed

Except for the fact that the space was needed for planting, the soil would have been cultivated for two or three years before replanting. The systems of tree removal described here are more expensive than sawing the trees off at ground level. In many cases the bulldozer method would be preferable, although the dynamiting method requires only a minimum of labor for removing the soil from the roots. Moreover, the leveling off the area and filling the holes requires less time than when trees are bulldozed out.



Pictured here is the same tree as shown in the lower photo on the opposite page. This method of dynamiting the tree before removing any of the branches was slightly higher in cost than from the prior trimming method.



Removing the top and main branches from the tree before dynamiting resulted in a need for only 2.7 pounds of dynamite compared with 3.5 pounds for Method A.

THE EFFECTS OF LIBERAL VERSUS LIMITED GRAIN FEEDING UPON MILK PRODUCTION

A. D. PRATT

The Belmont County Experiment Farm sits boldly astride a ridge in the rough terrain just west of St. Clairsville, Ohio. In this area a knowledge of the minimum amount of grain mixture that should be fed with the available roughage for most efficient production is more important than in the western part of the state where corn is grown easily and yields are heavy. The experiment to be described was designed to help answer this question.

On the Belmont County Farm, storage space for silage is limited; thus the Jersey cows were limited to 24 pounds of silage each daily. Home grown hay was alfalfa and grass mixed. The first cutting was usually ensiled and later cuttings made into hay. Purchased hay commonly was first cutting alfalfa.

The grain concentrate mixture consisted of the following, containing about 14% protein: Ground corn and cob meal 650 pounds, ground oats 200 pounds, soybean oil meal 150 pounds, salt 10 pounds, and steamed bonemeal 10 pounds.

The two different rates of grain feeding used are shown in the following table:

The herd of milking Jersey cows was divided into two groups comparable with respect to age, weight and milk production in previous lactations. Heifers were assigned alternately to the two groups at first calving. One group was fed the grain concentrate mixture at the limited rate and the other at the liberal rate. Cows of both groups were fed 24 pounds of silage daily and as much hay as they would consume. The record of hay fed to each group was obtained twice monthly by weighing the amount fed and weighing back the refuse. Thus the cows fed limited grain had the opportunity to eat additional hay to compensate for the extra energy in the liberally fed group. In summer the same rates of grain feeding were maintained with both groups of cows grazing together in the same pasture.

During the first winter after the experimental feeding began (Sept. 1, 1950) there was a noticeably sleeker hair coat and apparently better flesh on the cows fed concentrate liberally. After the first winter, however, there was no noticeable difference.

To date 41 lactations by 17 cows on liberal concentrate allow-

ance have been completed and 36 lactations by 15 cows on limited allowance. The 41 lactations on liberal concentrate allowance have averaged 8,765 pounds as compared with 9,277 pounds for the 36 on limited concentrate allowance. For this comparison the records were calculated to an equivalent amount of 4 percent milk (on an energy basis) and converted to a mature equivalent (305-2x-ME).

When cows were culled they were replaced by two-year olds. To be sure that culling has not biased the results, comparisons have been made of the first, second, third, and fourth lactations under this feeding system for both groups. This comparison shows that those starting on liberal concentrate allowance have declined in production consistently from lactation to lactation. Those on limited concentrate, started at a lower level of production, equaled the other group at the second lactation and continued to increase for the third and fourth lactations.

Production of calculated 4 percent milk should increase from the 2 year production to maturity. Calculation to a mature equivalent would result in the same production for each age group, if no external influences affected the results, thus making the records comparable for all ages.

The weight gains during the lactation have been greater for the animals on limited concentrate intake, all ages considered. It is apparent that this group had to consume more hay and pasture to compensate for the greater production and weight gain.

In this experiment higher production was obtained at lower cost with limited grain feeding. With higher quality roughage than was available, the proportion of grain probably could be still further reduced.

Daily Milk Production		Grain Fed Daily	
Actual Milk	4% Fat-Corrected Milk	Limited Group	Liberal Group
pounds	pounds	pounds	pounds
40	47	11.0	15
35	42	9.0	14
30	36	8.0	12
25	30	6.5	10
20	24	5.0	8
15	18	3.0	6
10	12	2.0	4
Dry	Dry	2.0	4

PRODUCTION OF MALFORMED ROSE FLOWERS IS NOT INHERITED

D. C. KIPLINGER and CHIKO HARAMAKI

Like other producers of agricultural crops, the greenhouse rose grower in Ohio today is faced with increased production costs coupled with a relatively static market price. The solution to this major problem can be approached by several means, among which are improved marketing methods, more efficiency in production, and also increasing the number of salable flowers per plant.

The number of salable rose flowers is affected greatly by a disorder known as malformation which in severe cases is called "bullheading". A bullheaded rose exhibits a lack of growth at the petal tips which gives the flower a flat topped appearance instead of the normal conical shaped bud. The tips of the petal curl inward, become darker in color, and only partially develop in length. The malformation first appears in the outer layers of petals and as the severity increases, the malformed petals are found progressively toward the center of the flower. In extreme cases all petals will be malformed with a definite reduction in length. With some plants over half the flowers formed may be bullheaded.

Bullheading is characteristic of a number of the most popular commercial varieties of roses such as Better Times, Golden Rapture, Talisman, Briarcliff, Cavalier, Snow White, and Starlite.

Just why roses produce bullheads is not known, but many possibilities have been suggested as contributing to their production. Thrips injury, ethylene gas, use of organic phosphate aerosols, low carbohydrate content which might prevent proper development of the petals, inherent characteristic of the plants, or variations in the

environment such as alternating temperatures and light intensity—all of these have been advanced as probable causes of bullheading.

At the Ohio Agricultural Experiment Station, investigations on the cause of bullheading include intensity and quality of light, temperature, and relative humidity. A separate study has been completed to see if malformed flowers were inherent to certain plants.

Many growers believe that certain plants consistently produced a high percentage of malformed flowers while some other plants produced a low percentage. If this was so, it would be desirable for the rose propagator to select strains of the particular rose variety which were less inclined to produce bullheads.

The Better Times variety of greenhouse rose which bullheads quite readily was selected for this study. The genetic constitution of all Better Times plants was considered to be alike, since they are all propagated by budding or

grafting. It is always possible, however, that a mutation may have occurred and caused the plant to bullhead more readily.

Individual production records were kept on 224 plants for a two year period. It was found that during the 1952-1953 season, the percentage of malformed flowers varied from 0 to 50, and in the 1953-1954 season from 0 to 59. Each year the plants were divided into ten groups according to the number of malformed flowers produced.

Upon comparing the lowest and the highest groups of malformed flowers for each year, it was found only in two cases that plants which produced a low percentage of malformed flowers the first year also produced a low percentage the following year. This same relationship was also noticed in plants producing a high percentage of malformed flowers. There were only five plants which produced a high percentage of malformed flowers for two years. Some plants which were in the highest percentage group during the first year were in the lowest percentage group the following year, and vice versa.



From left to right: Typical "bullhead" rose with flat-topped flower, severely malformed flower, moderately malformed flower, and a perfect rose.

HOG AND SOYBEAN PRICES WEAKEN WITH LARGE SUPPLIES

MERVIN G. SMITH

Prices of farm products on the average have held rather steady in the last few months. Prices of hogs, eggs and soybeans have weakened and are being watched very closely by farmers. Broiler prices had improved with the cut-back in production earlier this year. However, production now has been increased and larger market supplies are again pushing prices downward. Potato prices have strengthened sharply because of the frost in the early producing areas. Early peach and other fruit crops in the south were damaged heavily and early supplies of these fruits coming into Ohio will be short.

General Business Conditions

Considerable optimism is apparent in industry. Businessmen are starting to increase their investment in new plants and equipment. General construction continues to be a strong factor in the economy. Production of automobiles is holding up very well. However, business inventories apparently are on the increase and this may reflect some slowdown later in the year. The international situation and labor contract negotiations are dominating factors in the business atmosphere.

Farmer's income from farming has declined and this represents a weakness in our economy. More emphasis is likely to be given to aiding lower income farmers to improve their farming opportunities or to help them find other more remunerative employment.

Hogs

Hog prices as of April, this year, were about \$10 per hundred-weight below prices of a year ago or \$16 to \$17 this year as compared with \$26 to \$27 last year. Prices of hogs last year dropped sharply after April and, except for a small raise in August, they continued to decline to the end of the year and into the early part of this year reaching a low in early March.

Hog prices for the rest of this year are not expected to decline so sharply. Supplies of hogs on the market will continue high this spring but will be only slightly higher next fall than last year. Farrowings this spring, are expected to be about 5 percent higher than last spring for the U. S. but there may not be this much change in the number in Ohio. Prices are likely to increase and reach a peak in July or August possibly close to \$20 per hundred-

weight. After that, they are likely to decline as market supplies again increase.

Eggs

Egg prices may be in a stronger position this spring and early summer than they were last year. The number of laying hens is expected to be reduced next fall and this may keep egg prices slightly stronger in anticipation of shorter supplies later in the year. We have had a phenomenal increase in egg production per hen in the past few years. Our efficiency of production for eggs has improved faster than efficiency in many other farm enterprises. This may be the main reason why egg prices have not increased as rapidly as most other prices since the 1930's. This has also been true with broiler prices.

Soybeans

The cash price of soybeans at the present time is about \$2.40 per bushel as compared with about \$3.80 a year ago. This represents an extreme change in price. A year ago supplies were low, demand was good and price support was 80 percent of parity. This year supplies are larger, demand about the same and price support for this year's crop will be only 70 percent of parity.

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