Summer 1978

Farm, Ranch and Home Quarterly Institute of Agriculture and Natural Resources, University of Nebraska- Lincoln

FARM, RANCH AND HOME
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SUMMER 1978

Feedlot Pest Control

See Page 3

M.A. Massengale

From the Vice Chancellor

The Institute of Agriculture and Natural Resources is a highly complex organization. This is required to meet its goal of helping the people of Nebraska move ahead in productivity and quality of living.

The Institute's responsibility extends to all Nebraskans, no matter where they live or how they make their living. Nebraska's size, its varying topography and soil types, as well as varying life styles, make that responsibility even more complex.

It's important that the Institute provide its services to people wherever they are located in the state. To that end, we have divided the state into five research and extension districts. Each of the districts maintains a headquarters station where research and extension specialists work on problems and potentials unique to that region. District stations are located at Clay Center, Concord, Lincoln, North Platte and Scottsbluff.

Knowledge and technology gained through basic research is most beneficial to the people if that information is passed on to them in usable form.

The Institute's Cooperative Extension Service has the responsibility of providing that information. County and area Extension agents in agriculture, home economics, youth, and community development, as well as state and district specialists, employ many methods to get that job done. Publications, radio, TV, the public press, and local meetings and workshops are among the methods used.

Extension personnel, no matter where they are located in the state, are members of the IANR and University of Nebraska staff. They are in constant and direct communication with other divisions of the Institute, and provide the communications link between the Institute and the people of Nebraska.

The Cooperative Extension Service is a team effort between the federal government, the University of Nebraska, and county Extension boards to provide continuing educational programs in the important areas of agriculture and natural resources, community resources development, home economics, and 4-H and youth development.

If you are unaware of the Institute's programs in your area, stop in to see your county agent. You may find a wide variety of programs that could benefit you or your neighbors.

M. A. Massengale

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On the cover:

Field scouts kept track of insect populations in Dawson County Feedlot Pest Management Pilot Project. Such survey methods as this sticky trap were used. Feedlot operators could then take action to reduce the fly problem.

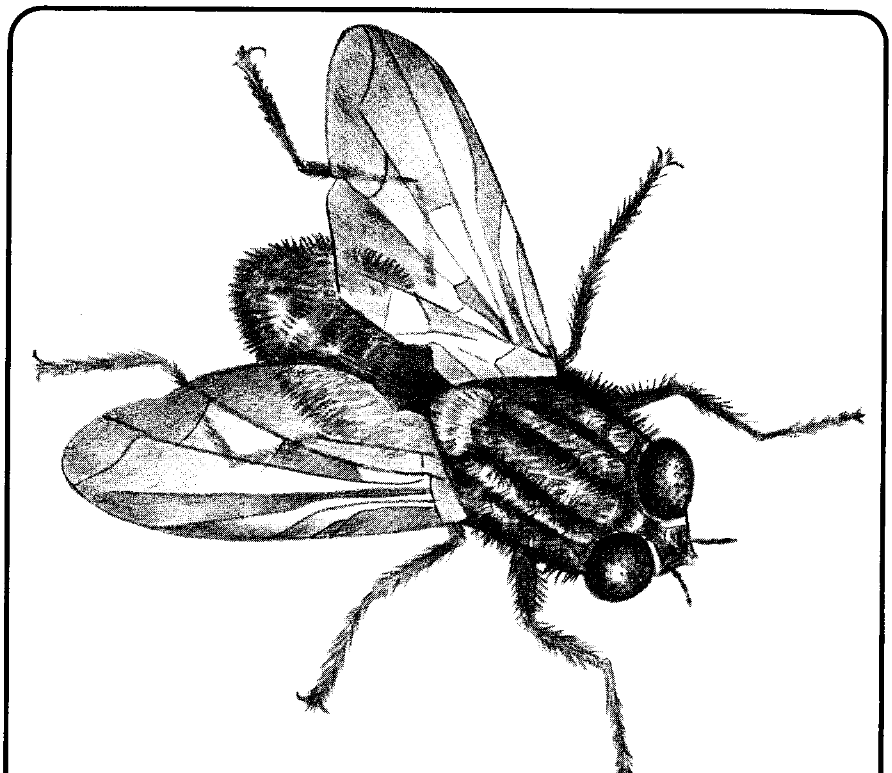
Farm, Ranch and Home

QUARTERLY

Summer 1978 **Vol. 25, No. 2**

In this issue:

Good Management Controls Feedlot Flies



By John B. Campbell and C. D. McNeal

The term "pest management" has recently become a popular one. It has been used to define the practice of managing insects by cultural, biological and chemical means so the damage occurring to the commodity remains small.

One purpose of pest management has been to lessen the use of chemical pesticides while still maintaining the quality and quantity of agricultural production. Pest management programs have been conducted on agronomic and horticultural crops using such cultural practices as crop rotation, delayed planting, early harvesting and resistant varieties to avoid excessive damage from insects.

Field scouts were used to keep weekly tabs on insect populations so preventive insecticide treatments could be avoided and any necessary treatments could be timed accurately.

Pest management of livestock insects had not been attempted until a Feedlot Pest Management Pilot Project was funded in 1976. Our research had shown that the stable fly—a pest of feedlot cattle—decreased weight gains by as much as

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Flies . . .

0.48 lb/day (.21kg) and decreased feed efficiency by as much as 13 percent.

We knew the current system of insecticide control of these flies was inefficient. Applications of insecticide as often as twice daily were sometimes required to relieve the cattle.

The project was established in Dawson County with assistance from Harold Stevens and Dave Stenberg, Dawson County Agricultural Extension Agents. The objectives of the project were to: 1) reduce fly breeding by making feeders aware of the location of the breeding sites, which could then be eliminated or treated; 2) make recommendations on management of fly breeding areas; and 3) reduce the need for insecticides through destruction of fly breeding areas and by making insecticide use more efficient.

There were 27 feedlot cooperators in the program in 1976, and 35 in 1977. Scouts visited each feedlot weekly and monitored housefly and stable fly populations with sticky traps and other survey methods. Maps of each feedlot were made with the pens numbered to conform with the numbering system employed by the feeder. Fly breeding areas were drawn on the maps and the developmental stages of the flies were indicated so the feeder knew the projected time of adult fly emergence.

Sanitation measures and insecticide applications were reported by the feeder and evaluated by the project leader or scout supervisor for effectiveness by noting fly population trends at the feedlot. Each feedlot manager received a weekly report of the fly conditions at his lot.

Recommendations Made

This report contained information on the predicted effect of his fly population on weight gains and feed efficiency. Fly breeding areas were located exactly and recommendations were made on managing these areas. Insecticide use was evaluated and recommendations were made on location, method and product used, as well as the need for insecticide applications.

In addition to the specific data for the individual feedlot, a short information sheet discussing fly control problems common among the feeders and suggesting solutions was included in the weekly report.

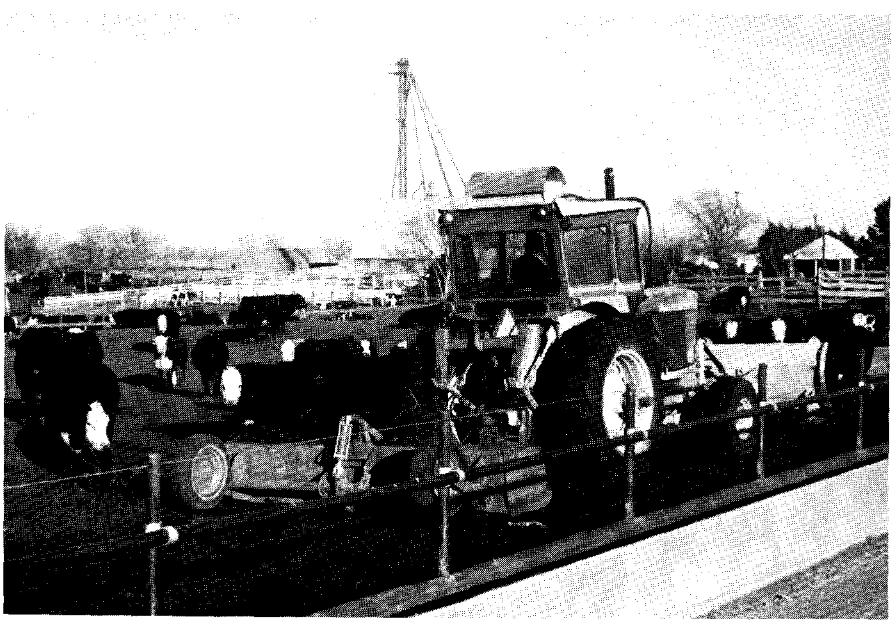
During the second year of the project, two basic changes were made. The first was to computerize the data system and the second was to give the average fly situation for all the feeders so each feeder could compare his fly situation with the other feedlots in the project.

In addition, a field day was held to demonstrate methods of managing fly breeding areas and methods of using insecticide for efficient fly control.

Evaluation of this pest management program showed that 83 percent of the cooperating feeders used some of our recommendations. When these recommendations were followed, pesticide use could be decreased.

Evaluation by us and our technical advisory committee showed we needed help from agricultural engineering for feedlot designs that could avoid some of the fly breeding potential, and from agricultural economics to help evaluate the cost of feedlot sanitation in relation to fly control.□

JOHN B. CAMPBELL is district extension entomologist and C. D. MCNEAL is Feedlot Pest Management Scout Supervisor at the North Platte Station.



Feedlot sanitation aids in pest control. Studies have shown that the stable fly can decrease weight gains and feed efficiency.

Tractor Day—Something for Everyone

By Rollin Schnieder

Tractor Power and Safety Day has come a long way.

Since its birth in 1952 the event has grown from crowds of 300 to a record attendance of 20,000 a few years ago.

Although there are many types of field days throughout the world, none are designed to accomplish the same purpose as Nebraska's Tractor Power and Safety Day. One purpose of Tractor Day, as it is often called, is to show the latest in equipment—whether for the farmer, homeowner or the backyard gardener. When the large round baler became popular, for example, that year's program featured baling.

Energy has been getting a lot of attention lately, and this has given rise to programs such as last year's, which dealt with solar energy.

One major attraction of Tractor Power and Safety Day is the display of new tractors tested at the world-famous University of Nebraska Tractor Testing Laboratory.

Past events have featured new tractor designs and tractor transmission demonstrations. In the late 1950s and early 60s these included such names as Lugmatic, Case-O Matic, Select-O-Speed and Synchro-Mesh. Ford Motor Company once displayed their free-piston tractor, a step toward turbine drive.

Minimum tillage was first shown to Nebraskans in 1957. Today this method, developed by Nebraska researchers, is being promoted nationally as an energy saver.

In 1954 professor Chauncey Smith showed off the Waterloo Boy, the first tractor tested at the University's Tractor Test Lab.

Nebraskans saw another first in 1965 with the unveiling of the ROPS (roll over protective structure). John Deere had tested a tractor with a ROPS in place. Overturn demonstrations were conducted on the ROPS in 1966 and 1968.

Tractor Day is not limited to topics concerning tractors, however. Last year's program included demonstrations on insulation, lifting with the three-point hitch, energy in relation to load, noise, pesticides, big bale handling, new ideas in planting, irrigation, rotary combines, tractor braking and the familiar tractor parade.

Every department on East Campus is invited to display or be part of the program. In addition, other agencies with programs relating to agriculture are invited to present educational displays. The College of Home Economics also has exhibits for the families which attend. There is something of interest for everyone, as illustrated by last year's program. That Tractor Power and Safety Day included a rocket launching by a 4-H rocket club; a chance to ask questions of the Nebraska State Patrol on moving farm equipment over roadways; and the cast of the long-running television show Backyard Farmer was available to answer questions, as were pesticide safety personnel.

Until crowds outgrew the campus, Tractor Day was held on the University of Nebraska East Campus. In 1963, the event was moved to the newly obtained Field Laboratory at Mead. Today attendance averages about 10,500. Food service was often a problem for such large groups. The Warren Methodist

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"Jughead" has always been a favorite figure at past Tractor Days. Jughead is shown in this 1959 tractor overturn demonstration.

A County Extension Home Agent answers canning questions at one of the many exhibits set up at Tractor Day.

International Harvester displayed this new concept in engineering several years ago. This tractor paired a gas turbine with a hydrostatic transmission. The machine in the background is a pelletizer.

Tractor . . .

Church ladies used to serve a lunch for $1, which included a tractor burger (sloppy joe), baked beans, chips, a cupcake and carton of milk or coffee. The move to Mead provided more room and also involved area organizations in helping out with food service.

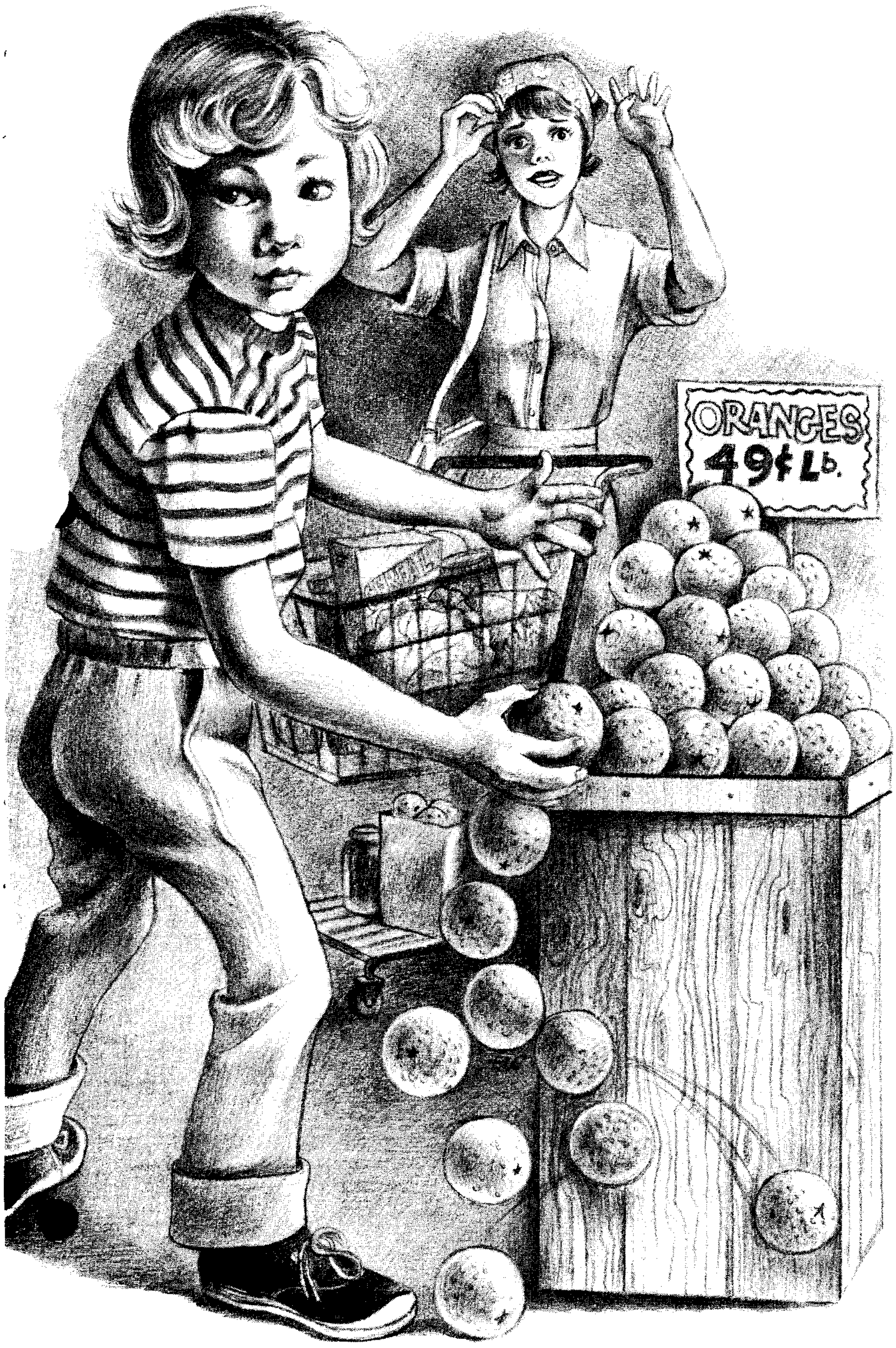
Tractor Day organizers always wonder what will be available in the years ahead. Over the past 27 years new ideas have always cropped up. The computer, for example, has become a part of farming, as proven by AGNET (Agricultural Computer Network). New sophistication in monitoring systems promises to be an exciting area.

This year's show will feature the largest tractor in terms of size ever tested at Nebraska. It does not have the most drawbar horsepower, however, it does have the most power take-off horsepower. Rotary combines will also be shown. There now are several on the market and more on the drawing boards. Since the last Tractor Power and Safety Day, there has been a new low-noise level recorded at the Tractor Testing Laboratory.

The Department of Agricultural Engineering has always prided itself on the fact that Tractor Day has been the second biggest event sponsored by the University of Nebraska. The only activity drawing more people has been Cornhusker Football. However, Big Red basketball could be moving Tractor Day to third place. Regardless, the University's Tractor Power and Safety Day is a one-of-a-kind service to Nebraska Agriculture.□

ROLLIN SCHNIEDER is Extension safety specialist.

How Not to Hit Your Children



By John DeFrain

Don't hit your kids in the head, a number of professionals have advised. You might injure their brains.

Hit your kids on the buttocks, others have written; not the lower back where kidney damage can occur.

Don't hit your kids at all, I advise in this article on "how not to hit your children."

Adults have used violence to control children for so long now that most of us probably believe it's "the right thing to do." But step back a minute, and look into this scene that Dr. Roger W. McIntire, a psychologist at the University of Maryland, describes:

> A mother and daughter enter a supermarket. An accident occurs when the daughter pulls the wrong orange from the pile and 37 oranges are given their freedom. The mother grabs the daughter, shakes her vigorously, and slaps her. What is your reaction? Do you ignore the incident? Do you consider it a family squabble and none of your business? Or do you go over and advise the mother not to hit her child? If the mother rejects your advice, do you physically restrain her? If she persists, do you call the police? Think about your answers for a moment (McIntire, 1973, p. 36).

Yes, think about your answers for a moment . . .

"Now let me change one detail," McIntire continues:

> The girl was not the mother's daughter. Do you feel differently? Would you act differently? Why? Do "real" parents have the right to abuse their children because they "own" them?

Of course they don't, McIntire implies. But he carries us even farther in his argument against violence toward children.

> Suppose the daughter was 25 years old, and yelled, "Help me!" Calling the police sounded silly when I first suggested it. How does it sound with a mere change in the age of the victim?

McIntire's argument hits home. Why should assault be condoned when it's against a helpless child, but illegal when it's against adults?

The reason goes back a long way to our basic notions about parenting and children. We believe that children are the property of their parents, and because of this, many fundamental rights of children can be ignored at will.

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Children . . .

This is a dangerous notion, and lends to incredible inequities. But, you may argue, there are good reasons for hitting children. We hit kids to keep them under control; if we didn't hit the kids, they would run amuck.

Instead of looking at good reasons for hitting, pinching and slapping children, however, let's look at the reasons we shouldn't:

- *It is an ugly act.* Go into a supermarket or discount shopping center and watch parents and children for half an hour. Watch parents push, pinch, slap, whack and snarl at their children. Supposedly, the parents are protecting the embattled shopkeeper from loss. But if a candy bar or a box of cereal is so important in our world, it would be better to leave the kids home when we go shopping. Many people, I'm sure, will not agree with my judgment; violence to them is not ugly—witness the tremendous popularity of violence we accept and enjoy on television.

One actor, who kills and maims three or four dozen people in numerous ways in each film, is one of the biggest box office attractions in cinema history.

- *Violence begets violence.* We may be able to control our children with violence. But we are also teaching them how to control others with violence in a twisted kind of Golden Rule: "Slap unto others as you would have them slap unto you." Years ago, as a playground leader, I watched the following scene in the space of 30 seconds:

> A teen-age boy, angered at one of his softball teammates for dropping a pop fly, pushes the smaller player into the dirt. Dusting himself off, the victim spies his five-year-old brother running happily across the field. To punish this transgression, the big brother kicks the little brother in the rear end and sends him sprawling. The little brother dusts himself off, whimpers a bit, and looks around the playground, menacingly. Spying no human smaller then himself to displace his fury, he maliciously attacks a dog, who trots off howling.

Numerous research studies have demonstrated the notion that violence begets violence. Television violence models violence for people, especially the young. But perhaps the most striking study in this area is that of the infamous assassins of the past century. Dr. Vincent F. Fontana looked at the childhoods of these men: Arthur Bremer, who attempted the assassination of George Wallace in 1972, Sirhan B. Sirhan, who assassinated Robert F. Kennedy in 1968; James Earl Ray, who assassinated Martin Luther King in 1968; Lee Harvey Oswald, who assassinated John F. Kennedy in 1963; Guiseppe Zangara, who attempted the assassination of Franklin Delano Roosevelt in 1933; John N. Schrank, who wounded Theodore Roosevelt in 1921; and John Wilkes Booth who assassinated Abraham Lincoln in 1865.

For some, family history was somewhat sketchy, Fontana reported; but, in all the cases in which he could get solid data, these criminals themselves were judged to be the victims of an abusive or neglectful childhood environment. Fontana concluded:

> These are history's famous criminals; famous because they struck out at famous people. If they had chosen every day targets such as you, your neighbor, a farmer, a ghetto storekeeper, or a housewife, the odds are that we would never have heard of them or learned anything about their backgrounds. But as things are, we do know something about them, enough to suggest, though not to prove, that a cold or callous or savage childhood environment produces the cold or callous or savage adult; it leads to a violent future (Fontana, 1973, p. 104).

This is not to argue, of course, that all children who grow up in violent surroundings will be violent in later life—human development is not so simple. And, this is not to argue that by whacking kids occasionally we traumatize them for life; children, fortunately, are quite resilient. To argue that violence begets violence, however, means that we have a wealth of research pointing in this direction—and we are only kidding ourselves when we think that hitting children is good parenting. Clearly, there is a better way.

- The best argument of all three is that one: *There is a better way.* It is less dramatic. Sometimes in the short run it is a bit less effective than violence. But in the long run it can and does work wonders. Simply stated: *Teach your kids; don't hit them.*

What exactly does this mean? Take a quiet, thoughtful look at your children. Just watch them. You'll find, as I've found and as many observers of children have found, that kids do many strange things by adult standards. They get into things, they mess up things, they do "dumb" things. Undoubtedly true. But they are children. When they have grown and their ability to reason has improved, they won't do quite as many "dumb" things, and they will be called adults.

Just because kids do things that exasperate adults is no reason for violence. If you take the time to watch children closely, you'll also notice that the vast majority of the things they do are not malicious. The child is simply acting out of curiosity.

The following example is meaningful to me. One day I was watching my five-year-old daughter. She was sitting at the kitchen table with a large glass of water. Suddenly, an idea popped into her head. She began to tip the glass, slowly, slowly, slowly. The water level climbed up the edge of the glass. It hesitated at the edge, *grew higher than the edge of the glass!* for a precious second as she watched, totally amazed. Then it poured onto the table. It poured and poured. It splashed to the floor and soaked into the carpet.

At this point, I interceded. Rather than admonishing her for doing something which appeared stupid or bad, I had the presence of mind to be calm. We cleaned the mess up together; we talked about water, gravity, and other wonderful things. We also talked of the effect of water on wooden furniture and carpets. Then, we tried more experiments—in the bath tub where they belong.

If I had scolded or slapped her, she would have cried; I would have had to clean up the mess by myself while she moaned unhappily in her bedroom behind a slammed-shut door. The next time she played with water, she'd play in her bedroom in secret.

Instead, I used my adult brain to help my child's brain learn new things. She had a valuable learning experience. So did I! And life remained peaceful.

Don't get me wrong. My life with children is full of problems—just as full as yours. They wear me out. I lose my temper. But I try not to lie to myself and say losing my temper is the best thing to do. And, I don't hit my daughter any more. I used to, but I've found it to be a great cop-out on my part.

I've been fortunate to work with many tough young children. Children labelled mentally ill; labelled emotionally disturbed, schizophrenic. I've seen children act like enraged animals, kicking, spitting, biting, growling, throwing food, snapping, defecating. And, I've seen many of these children change rapidly—drastically—in a matter of short weeks, in a few months, with the help of professionals working together with parents. In none of the success stories was violence found to be necessary. The violent kids became tame without violence.

Take an example from the behavior of more normal children, though. Two five-year-old boys are arguing. One slugs the other in the face. If you intercede by slapping the aggressor "to show him how it feels," chances are you aren't teaching him much. He does get the picture that violence is okay, however, if you can get away with it.

Rather than modeling violence, simply get between the boys and start talking. Calmly. If that doesn't work, separate them. Sit them apart for five minutes until they cool off. Then, do the important thing. Get them back together and teach them to play together. Teach them how to share. In the long run, it is far more effective.

We don't need to hit children. And, for certain, we don't have the inalienable right to hit them, either.□

JOHN DEFRAIN is assistant professor in Human Development and the Family.

References

Fontana, Vincent J. *Somewhere a child is crying*. New York: New American Library, 1976.

McIntire, Roger W. "Parenthood training or mandatory birth control: Take your choice." *Psychology Today*, October 1973.

A large cottonwood marks a modern day highway.

Cottonwoods for Nebraska

By W. T. Bagley, W. R. Lovett and C. C. Ying

When the Eastern cottonwood *(Populus deltoides)* was chosen Nebraska's state tree in 1972, it was lauded primarily for the beauty it added to our river valleys and its importance to our early settlers for fuel and lumber.

This tree, however, is also much sought after by manufacturers of boxes, pallets and baskets, and by pulp mills for use in high quality paper for magazines. Today, nearly 60 percent of the timber volume in Nebraska is cottonwood.

Cottonwood trees grow extremely fast where soils are reasonably fertile and water is adequate. They have great potential as sources of energy. The stems and leaves can be burned to produce heat, or converted to alcohol to fuel our engines, or to food for our animals. As a part of windbreaks and field shelterbelts they can save energy by the protection they provide our homes, livestock and crops. They can be used to provide quick shade in urban areas where space is available for trees which may become very large.

The market value of cottonwood will increase as world wide demand for wood increases and as oil and gasoline supplies decrease. Since they do not require intensive annual cultivation, the amount of energy harvested is considerably greater

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Cottonwoods are a variable species and can be a valuable crop. UNL researchers are seeking the trees most adaptable to Nebraska.

Cottonwood . . .

than the amount of energy required to cultivate.

Cottonwood improvement research is conducted as a cooperative endeavor of Agricultural Experiment Stations of the North Central Region. The purpose of this research is to find varieties of cottonwood trees which will yield more and better products, and provide quicker and longer-lived protection than is provided by those we are now growing.

Cottonwood seed was collected from throughout the eastern half of the United States under the leadership of the Forestry Department of the University of Illinois. That institution grew and distributed seedlings to several states, including Nebraska. Over 1,500 seedlings were planted in a propagation bed on the UN–L East Campus in 1965. The following year cuttings from this bed were used in an experimental planting at the Field Laboratory near Mead.

Evaluation revealed that cottonwood is an extremely variable species in such heritable traits as growth rate, form and pest resistance. As in wheat and corn, there are varieties resistant to disease and those that are also better adapted to specific soil and climatic conditions.

Trees of Missouri origin have grown fastest in our plantation. They averaged 40 feet tall and 6 inches in diameter seven years after planting. Trees from Nebraska, Kansas, Indiana, Ohio and Pennsylvania averaged 4 to 6 feet shorter but about the same size diameter.

Trees from northern Illinois, Minnesota, Wisconsin and South Dakota were smaller in diameter and height. Trees originating south of the Tennessee-Mississippi border are not winter hardy because they hold their leaves too late in the fall and fail to harden off properly. As a consequence, all of them have dead branches in the tops and many have died.

Trees from Indiana, Ohio and Pennsylvania tend to have large branches, dense foliage, spreading crowns and rough thick bark. In contrast, trees from Kansas, Nebraska, South Dakota, Minnesota and Wisconsin have smaller leaves and branches and smoother and thinner bark.

Rooting Important

Rooting of stem cuttings is an important method of cottonwood propagation. Our investigations also revealed that the stem cuttings of trees originating from Nebraska, Wisconsin and Minnesota developed strong root systems more quickly than cuttings from trees from the eastern United States. Ease of rooting is especially important if unrooted cuttings are planted in the field.

Stem canker, a serious disease which shortens the life of cottonwood, was more prevalent on trees of Northern Great Plains origin than those from other areas. It has caused many trees of "Siouxland" cottonwood and "Lombardy" poplar in Nebraska to die at about 10 years of age.

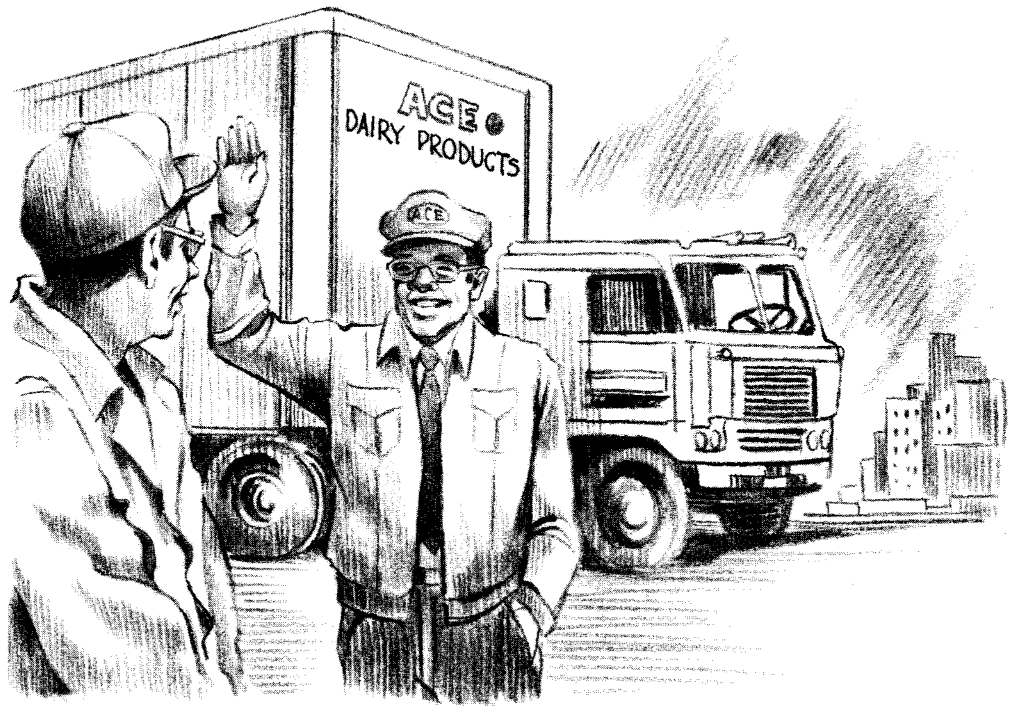
Leaf spot diseases can also affect the rate of growth and longevity of cottonwood. Long periods of high humidity and warm temperatures during the growing season favor these diseases. We have not been able to identify trees with outstanding resistance to leaf spot disease because we have not yet had a serious infection in our research plantation.

A group of cottonwood trees selected from the Mead plantation for fast growth and disease resistance will be planted in several other locations in the state for further evaluation. Selected cottonwoods will be available to private nurseries upon request. Male trees have been identified and "cottonless" cottonwood can be made available. Outstate observations will allow further refinements in varieties recommended for planting on our various sites.

Plantations established from cuttings insure that genetic or heritable characteristics will be maintained. A mixture of trees with variable, but desirable characteristics, will be available through the Clark-McNary tree distribution program. By retaining some genetic diversity in large plantations, we will reduce the possibility of a calamity if disease, insects, or some unusual environmental situation places the trees under stress.

The next step in our improvement program will involve cross pollinations among the trees with desirable characteristics. The result will be varieties well adapted to specific sites for specific purposes.□

W. T. BAGLEY is associate professor; W. R. LOVETT is assistant professor and tree improvement forester; and C. C. YING is former research associate in Forestry, Fisheries and Wildlife.



Agricultural Job Openings Forecast

By Roy D. Dillon

Agricultural products processing firms in Lancaster County will be needing more workers within the next three years. A study of 12 types of agricultural processing firms showed about 852 entry-level full-time and 368 part-time employment opportunities will occur in the next year. This forecast is based on opportunities from turnover, promotion, retirement or death.

Managers in a random sample of 30 firms were interviewed, representing each of 12 categories:

Meat Processors	Dairy Products Distribution
Meat Distribution	Grain Elevators
Livestock Handling	Feed and Seed Dealers
Wholesale Leather	Locker Plants
Poultry and Eggs	Food Manufacture
Dairy Products Manufacture	Food Distribution

Full- and part-time employment opportunities were projected in 27 job titles within the 12 types of firms as shown in Table 1.

A relatively stable employment picture with low turnover rates is seen in most job categories and many industry classifications. According to employers, turnover rates are highest among the jobs in production labor. The turnover in the production labor area is largely because of the newly hired employee having difficulty adjusting to the work environment. Turnover of persons employed in this job category drops substantially after the first month of employment.

Teaching the skills necessary for performance of the entry level jobs is generally undertaken by the employer. Many of the activities in these jobs are unique to the particular business, so on-the-job training is necessary regardless of any skills taught in high school. The burden of this training program currently falls on the industry. This can be aided with vocational education in the general skills necessary for employment in these jobs.

The statistics on employment in the next three years show stable or declining employment opportunities in some firms engaged in agricultural products processing. Employers generally did not have sound estimates of their employment needs on this longer term basis. This could either be because of a lack of long term planning or delay of expansion plans because of economic conditions. Although there is not a rapidly expanding job market in these industries many employers expressed a need for entry-level employees who are better oriented toward the

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employer-employee relationship.

If the prospective employee enters the firm with a positive orientation toward the employment relationship and some basic skills needed in his or her new job, 1) the employee will adjust more easily, 2) he will advance more rapidly, 3) he will be less likely to quit or change jobs and 4) he is more likely to start at a higher wage.

Agricultural products processing businesses can be valuable partners in an educational program by participating as training stations for education of high school youth. There is no better way to find out what the "world of work" is like than to participate in an on-the-job learning situation on a part-time basis while attending high school.□

ROY D. DILLON is professor of Agricultural Education.

Table 1. Number of employment opportunities in next year.

Job Title	Full Time	Part Time
Route salesman in food distribution; Food manufacture	24	
Delivery man; feed and seed	8	
Routeman; Dairy products manufacture	48	
Delivery/warehouse worker; Food manufacture	12	4
Wrapping and shipping helper; Food distribution	12	
Salesman; Wholesale dairy products	0	
Implement salesman; Grain elevator	4	
Store clerk; Food distribution	8	
Produce truck driver; Food distribution	0	
Truck driver; Livestock handling	92	
Yard man; Livestock handling	0	100
Stockman; Wholesale leather	4	
Feed/fertilizer man; Grain elevator	12	
General labor; Grain elevator, feed and seed	104	
Production labor; Meat processing; dairy products mfg. food products manufacture	320	256
Starter poultry production worker; Poultry and eggs	40	
Egg processor; Poultry and eggs	56	
Incubation worker; Poultry and eggs	24	
Bread department helper; Food distribution	16	
Pastry helper; Food distribution	12	
Apprentice sausage maker; Locker plant	4	
Sausage maker; Meat processing	0	
Apprentice butcher; Locker plant	4	
Meat broker; Meat distribution	0	
Registered representative; Grain elevator (grain broker)	0	
Machinery set up man; Grain elevator	4	8

Range Judging— An Outdoor Classroom

By James T. Nichols and Peter N. Jensen

More than half the land in Nebraska is an outdoor laboratory. From it, both youth and adults can learn about rangeland—one of Nebraska's most extensive and important natural resources.

There are more than 24 million acres of rangeland in Nebraska and for the past 24 years range judging contests have been used as an educational tool. Each year, seven area contests representing different parts of the state (see map), followed by a statewide contest, have put competition into learning about rangeland. Ribbons, plaques and books on plants have been awarded to top individual and team winners.

The subject matter for range judging contests consists of three major parts. The first is identifying several range plants (usually 24), and noting important characteristics of each plant (Figure 1). The range plants can be of different types including grasses, forbs (broad-leaf plants), shrubs and grasslike plants.

There are hundreds of different range plants in Nebraska, varying in importance and usefulness. However, a list of 145 plants covers those that contestants are expected to know.

A second part of the contest centers on a small "roped-off" area that represents a particular range site (Figure 2). Contestants are expected to name the range site; determine range condition; and indicate the degree of grazing use that has taken place. There are 24 range sites recognized by name in Nebraska. Only 12 of the most important are included in range judging contests and for any one contest no more than three range sites are judged.

In the third part of the contest, contestants are asked to look at a ranch map and determine what changes and practices would improve overall range management for that ranch. Questions on range management are also asked during this part of the contest.

The range judging program began in 1954 when Dr. Don Burzlaff and Lorenz Bredemeier, former Nebraskans with the University of Nebraska and Soil Conservation Service, held the first training school in range judging. That school had about 25 contestants. It has since grown to 1,381 contestants in 1977.

For several years the contest was somewhat restricted to the western two thirds of Nebraska, where most of the range area is. In 1966, training schools for vocational agriculture teachers and county extension agents were held in the eastern part of the state. The five range judging areas were then expanded to seven, which now includes all 93 counties.

Figure 1. Range judging contestants identify a plant. Contestants must also give the season of growth, life span and grazing response for each plant.

Participation in area contests has increased steadily since 1962 (Table 1). The number of contestants has increased from about 250 in the first years to over 1,100 in 1977. Area contests are good training for the state contest, held later in the season.

The state contest is the climax of the Nebraska range judging program. This contest is in late September or early October after completion of the area contests. Participation has varied from 134 to 275 contestants during the 16-year life of the contest (Table 2).

Successful contestants in Nebraska who want to compete outside the state may enter the International Land, Pasture and Range Judging Contest, held each year at Oklahoma City. Contestants may also compete in the Old West Regional Range Judging Contest which is held in one of the five Old West States in the following order: South Dakota, Nebraska, Wyoming, Montana and North Dakota. Nebraska hosted the contest in 1977 at Halsey. A total of 182 contestants from all five states participated. The 1978 Old West Contest will be in September at Buffalo, Wyoming.

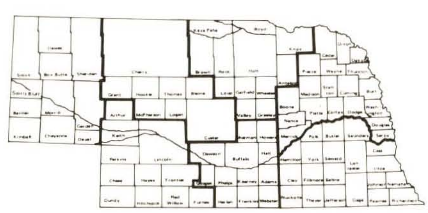
A 14-member State Range Judging Committee governs the contest. The committee consists of personnel from several agencies and organizations, including: University of Nebraska Cooperative Extension Service, Soil Conservation Service, Natural Resources Commission, State Association of Natural Resources Districts, State 4-H Club Office, Society for Range Management, Nebraska Cooperative Extension Association, State Department of Vocational Education and Nebraska Vocational Agricultural Association.

Figure 2. These contestants must determine the name of the range site, the range condition and the degree of grazing in the roped area.

The 1978 Range Judging Contests will be in September and October in each of the seven areas outlined in Figure 1. The State Contest will be September 30 in Cherry County—the heart of the Sandhills.

Two new publications are available this year to help those hosting a contest and also for contestants to help prepare for judging. The "Contest Guide for Range Judging" outlines procedures for organizing and conducting a contest. The other publication, "Range Judging Handbook" helps individuals learn more about range and to prepare for participation in range judging.

Division lines of seven area contests.



Range judging contests are primarily an educational tool, but they are also expected to be an enjoyable experience. Rangeland as a natural resource supports a major part of the livestock industry of Nebraska. To appreciate it and learn about it helps insure that it will remain well managed and productive. Range judging contests will help sustain this valuable natural resource.

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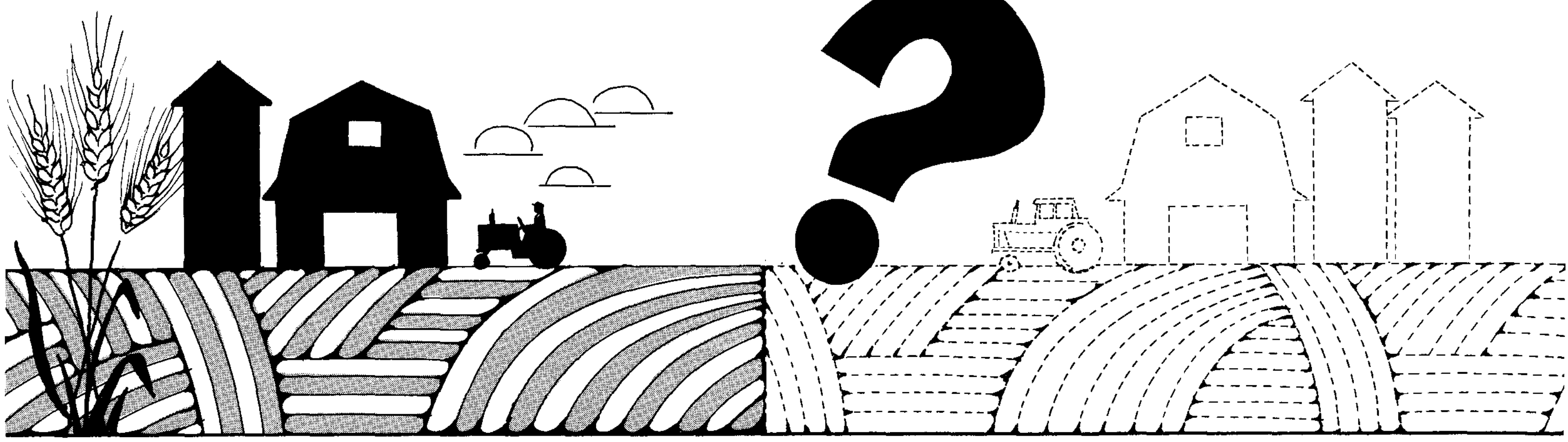
Table 1. Participation of contestants in Nebraska Area Range Judging contests from 1962–1977.

Year	FFA	4-H	Adults	Total
1962	123	57	23	253
1963	90	59	16	250
1964	148	74	21	254
1965	150	60	35	245
1966	205	56	23	284
1967	314	44	56	414
1968	405	46	38	489
1969	340	38	68	446
1970	577	55	66	698
1971	682	32	85	799
1972	609	50	41	700
1973	875	57	56	988
1974	939	82	116	1137
1975	961	55	102	1118
1976	740	66	99	905
1977	980	45	116	1141

Table 2. Participation of contestants in the Nebraska State Range Judging contests from 1962–1977.

Year	Location	FFA	4-H	Adults	Total
1962	Halsey	76	84	57	217
1963	Valentine	111	94	70	275
1964	Alliance	86	47	70	203
1965	O'Neill	81	27	26	134
1966	North Platte	--*	--*	--*	186
1967	Ainsworth	--*	--*	--*	201
1968	Kearney	133	29	29	186
1969	Thedford	121	35	35	191
1970	Atkinson	114	44	62	220
1971	Broken Bow	83	47	28	158
1972	Oshkosh	97	31	20	148
1973	Red Cloud	108	37	17	162
1974	Ogallala	109	31	27	167
1975	Burwell	169	53	37	259
1976	North Platte	155	45	32	232
1977	Lincoln	167	45	28	240

*Numbers not available for these categories.



TO EXPAND — or Not to Expand?

Editor's Note: This is the first of two articles on growth and survival in wheat farming. This article summarizes expansion alternatives while the second article in the Fall issue will emphasize financial alternatives.

By Larry J. Held and Glenn A. Helmers

Nebraska wheat farmers face much risk from highly variable prices and yields. Recent droughts and low prices caused concern about the economic survival of wheat farms. Also, the recent peaking (and in some cases slippage) of land values, suggests that highly leveraged growth through land purchases can lead to financial vulnerability.

An important question is how to increase the stability of wheat farms by improving the chances of survivorship under risky conditions. However, an important aspect of the question is to determine what is sacrificed as stability is increased. It is often suggested that a reduction in growth of net worth or net income could occur as stability is increased.

The future is unknown; yet by examining possible trends in yields, commodity prices and land and input prices, we can determine the chances of growth and survivorship of wheat farms. When this risk framework is simulated, we can examine the results of alternative actions or decisions.

The choice of stability or growth is subjective: it varies from one farm operator to another. Some place a high premium on stability while others are more interested in growth or income, irrespective of the risks. The financial condition of the farm plays a role in this choice. As a farm grows and improves financially, the concern over instability tends to lessen.

Instability can be measured in various ways. We define instability as the possibility the farm business will not remain solvent.

Results in this article were from simulating the financial affairs of a 960-acre Nebraska Panhandle wheat fallow farm for the 1976-1990 time period. Different expansion alternatives, such as purchasing land and share-renting land are examined, as well as the effect of different land appreciation rates upon that choice.

In this model machinery and operating inputs started at 1976 prices and were inflated 5 percent a year. Machinery costs and machinery purchases were simulated to represent real conditions. A beginning land value of $375 per acre was used and allowed to increase by 4 percent a year. Alternatively, zero and 8 percent increases in land values were examined.

Two basic wheat price patterns and two yield patterns were constructed for the 15-year-period. Together they form four different price-yield combinations, as shown in Table 1. The four combinations reflect a wide range of conditions. Model 1 of each reflects relatively poor conditions while Model 2 reflects relatively good conditions. Together, one combination reflects poor conditions, two of intermediate nature and one for good price-yield conditions. One hundred 15-year price-yield patterns were then chosen from a distribution of prices and yields based on the four basic trends just described. This was done to reflect the possible variability of prices and yields. The performance of the farm was then observed for each price yield model by examining its performance 100 times for a 15-year period.

Beginning net worth was assumed to be 65 percent equity of starting total assets of $391,132. Opportunity for land expansion through purchase or share-rent was made available six times in alternate years in 320-acre tracts. The farm operator was allowed to purchase the land if owner equity did not fall below 40 percent. A 7 percent interest rate was assumed for long-term debt.

Under a share-rent option, renting could likewise take place if owner equity did not fall below 40 percent. Under share-renting the operator received two-thirds of the production and paid two-thirds of the fertilizer cost. A combination of purchase and share-renting was also permitted, the decision based on net cash flow. If the net cash flow was positive from year 1 to the decision year, a land purchase was made. A rent decision was made if the net cash flow was negative. Finally the option of not expanding was also examined.

Machinery was purchased as acreage increased. In years cash flows were negative, capital was borrowed. Short-term interest rates were assumed to be 8 percent. Repayment of debt occurred in years of positive flows. The farm's borrowing capacity was equal to 60 percent of total assets minus outstanding debt. Failure was defined when owner equity fell below 40 percent. Survival was measured by the successful completion of 15 years with the rate of survival determined by the percent completion of the 100 trials. For those firms surviving, ending net worth and average net income for 15 years was determined.

Table 2 shows the results of the 100 trials for all the expansion alternatives. A 4 percent land inflation rate was used in this analysis. Survival rate was clearly the highest under share-renting. A complete purchase expansion option incurred low rates of survival. At low price-yield trends, not expanding meant lower rates of survival compared with the share-rent and combination alternatives.

The combination option tended to have intermediate rates of survival. However, it is clear that a full purchase expansion option under all price-yield conditions meant lower rates of survival than other alternatives. The higher levels of debt made this option vulnerable to price and yield risk even under high average yields and prices.

Only under the high price and yield level did the purchase option perform significantly higher than other options in growth of net worth. Share-renting or the combination option performed better or nearly as well in this respect for the lower three price-yield levels. The reason the survival rate declined for the high price-yield trend was because of the tendency to purchase more land under this option. Clearly the increased survival of share-renting and the combination plan does not usually meet with a sacrifice in net worth growth. Not expanding did result in a significant sacrifice in growth of net worth.

Under this option the operator owned less land than under other options and did not receive the advantage of rising land values. Compared with share-renting, less land was farmed yielding lower income, which resulted in a lack of growth. We can conclude that for most price yield conditions, not expanding involves a definite sacrifice in growth; while a full purchase route is likely to mean difficulties in survival.

Turning to net income, share-renting led all options followed by the more conservative combination plan, purchase and no expansion respectively. Higher debt levels of the purchase option and the smaller size of the unit undergoing no expansion limited the income-generating potential for these two options.

The effect of different land value inflation rates was also examined. As expected, high land inflation rates cause the survivorship of the purchase alternative to increase while greatly increasing its growth potential. However, net farm income of the purchase option falls dramatically under these conditions due to increased interest costs and land taxes. Hence, a definite trade-off between growth and income takes place under a growth option when land values are rapidly increasing. For share-renting and no expansion, net income also falls under higher land inflation rates because of higher taxes on initially owned land.

The results of this research suggest that either a moderate growth plan (combination) or expansion through share-renting allow for growth yet maintain relatively high survivorship.

Further, even under high price and yield conditions, the growth potential of share-renting or a combination option involves only a relatively small sacrifice in growth compared to the purchase option, yet they maintain high rates of survivorship. The option of not expanding is not without risk due to the potential of low survivorship under low price and yield conditions. These results confirm the problems of vulnerability of an investment plan based exclusively on purchasing land while maintaining high debt levels.□

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Table 1. Average and range of wheat prices and yields for two 15-year price models and two 15-year yield models.

	Average	15-year range
Wheat price model 1 ($)	3.64	2.57- 4.94
Wheat price model 2 ($)	3.97	2.94- 4.87
Wheat yield model 1 (bu)	30.95	22.0 -44.75
Wheat yield model 2 (bu)	36.42	23.5 -44.75

Table 2. Financial results of 100 trials investigating four expansion alternatives with four price-yield situations assuming a 4 percent increase in land values per year.

	Rate of Survival (%)	Survivor's ending net worth ($)	Survivor's ave. net farm income ($)
Price Model 1 - Yield Model 1			
Purchase	1	491,511	9,899
Share-rent	73	535,354	29,460
Combination	68	538,592	29,112
No Expansion	37	344,646	4,586
Price Model 2 - Yield Model 1			
Purchase	8	598,776	12,437
Share-rent	99	650,506	35,363
Combination	95	656,572	32,874
No Expansion	85	405,137	8,064
Price Model 1 - Yield Model 2			
Purchase	23	782,235	26,762
Share-rent	100	681,483	43,706
Combination	67	742,259	33,883
No Expansion	100	471,002	15,369
Price Model 2 - Yield Model 2			
Purchase	47	949,229	37,482
Share-rent	100	815,326	53,673
Combination	66	925,029	39,748
No Expansion	100	577,798	24,252

Dry Bean Disease Plagues Farmers

By John E. Watkins,
James R. Steadman and Eric D. Kerr

Nebraska is first in production of Great Northern beans in the nation. It is third in acreage of Pinto beans and fifth in total dry edible bean production. Most dry bean acreages are in the Panhandle, but acreage is increasing in southwestern Nebraska. Approximately 120,000 acres (48,000 ha) are planted to dry beans with average yields between 1,800 and 2,000 pounds (810-900 kg) per acre.

Many diseases plague dry bean production, however, and each year growers lose thousands of dollars from diseases. White mold, common bacterial blight, fungal root rot and bacterial wilt reduce total yields. Bacterial halo blight and brown spot, as well as bean rust, occur less frequently but are potentially dangerous diseases. The bacterial blights and white mold may lower seed quality and cause an increased culling out of poor quality bean seed during cleaning and processing. In 1973 the low average yield of 1,600 pounds (720 kg) per acre was primarily because of wet weather which favored severe white mold disease development in late summer and early fall.

White mold disease is the major production problem of dry beans in Nebraska. Fusarium root rot ranks a close second in terms of overall disease losses. Common bacterial blight and bacterial wilt are the two most destructive bacterial diseases. Rust, like brown spot and halo blight, occurs sporadically but with changing production practices these diseases could become more common on beans grown under sprinkler irrigation. Maximum control of dry bean diseases—whether through resistant varieties, altered production practices, or use of chemicals—is needed to realize the full production potential of a field.

White mold or sclerotinia wilt is a fungus disease which in recent years has become widely distributed and progressively more severe in irrigated dry bean areas of western Nebraska. This disease frequently becomes a problem later in the season after a period of wet, humid weather or frequent irrigation and heavy dew.

White mold disease is caused by *Sclerotinia sclerotiorum*. This fungus attacks a wide range of plants including sunflowers, many vegetable and forage crops and dicot weeds. The fungus persists indefinitely in the soil because of its ability to survive in a resting stage as sclerotia.

Under moist, humid conditions infection can occur by germination of sclerotia to form strands of white mold which colonize first dead, then living plant tissue. The majority of infection, however, is initiated by germinating spores which are ejected from mushroom-like structures that emerge from sclerotia during moist soil conditions. The germinating spores must colonize senescent or dead leaves or blossoms before attacking healthy leaves, pods, or stems. The most common means of spread of the fungus after initial infection is by contact of healthy plant parts with colonized tissue.

There is no effective method for

DRY BEAN DISEASES

Diseases	Symptoms	Environmental Conditions Favoring Disease	Method of Transmission	Recommended Control
Root Rots *Rhizoctonia solani, Fusarium solani* F. sp. *Phaseoli, Pythium* spp.	Reddish-brown to dark brown rotted areas on taproot at or below soil line; plants stunted; may or may not yellow.	Mid to late season disease favored by dry, compacted soil.	Spread is not a factor since the fungi already persist in soil and attack roots during favorable weather conditions; spread is by anything that moves soil.	Crop rotation; adequate irrigation; minimize soil compaction by subsoiling; seed treatment for seed decay and seedling blights.
White Mold *Sclerotinia Sclerotiorum*	Infection first seen as small, soft, watery spots on stems, pods, and leaves; spots enlarge to become a rotted watery mass often covered by a white moldy growth; plants wilt and die; stems contain small black bodies; seeds are a chalky color and lightweight.	Weather conditions favoring mold growth are 60-75° F temperatures accompanied by long hours of dew or light frequent rains; lush, vigorous vine growth creates conducive microenvironment within the plant canopy.	Fungus survives in soil and on crop residue as hard black bodies (sclerotia); spores spread by wind and irrigation water.	Use of less viny varieties; weed control; avoid late season irrigation when possible; avoid fields with recent history of white mold; avoid using irrigation runoff from these fields.
Bacterial Blights Common: *Xanthomonas phaseoli* Halo: *Pseudomonas phaseolicola*	Small, watery spots on leaves which rapidly enlarge and turn brown; spots often surrounded by a light green (halo) to lemon yellow (common) border; seeds are shriveled, discolored and shrunken.	Common blight favored by warm, moist weather; cool temperatures favor halo blight; hail can predispose plants to infection.	Bacteria seed-borne and spread by splashing rain, small animals, insects, cultivation, and irrigation water; survive on bean residue for 2 years.	Use certified seed; 3-year rotation; avoid entering the field when foliage is wet; seed treatment with Streptomycin for surface contaminated seed; plant varieties tolerant to common blight; avoid reuse of irrigation water from previously infected fields.
Rust *Uromyces phaseoli*	Dark reddish-brown pustules on leaves; spores rub off onto fingers when touched.	Infection occurs during cool nights and warm 60-70° F days when heavy dews remain on foliage for several hours.	Spores wind blown; new infections occur every 10-15 days under favorable weather conditions.	3-year crop rotation; apply foliar fungicide if infection is severe; cultivation to remove crop residue; rust more severe on late planted beans.
Bacterial Wilt *Corynebacterium flaccumfaciens*	Leaf symptoms similar to common blight; wilt occurs at any growth stage; wilted leaves dry, turn brown, and drop off; dark green lesion on pods; seed discolored, shrunken, and wrinkled.	Warm temperatures accompanied by heavy dews, driving rains, and hail favor disease development.	Bacteria are seed-borne and survive for 2 years on crop residue and spread by wind, irrigation water, splashing rain, and hail.	Plant disease-free seed from certified fields; crop rotation; cultivation to reduce crop residue; plant tolerant varieties.

control of this disease at present. There are, however, several practices which reduce losses.

High humidity favors initiation and spread of white mold. Thus, any method of bean culture which reduces the amount of moisture on the soil surface and in the air around the plants helps control the disease. Planting the crop in open rather than in sheltered windbreak areas, planting in well-drained areas, and reducing irrigation if white mold becomes established in the field helps reduce crop losses.

Although presently there are no resistant or tolerant varieties available, some characteristics and observations on local varieties may be useful:

1. GN Tara and GN Jules, in particular, and also GN UI 59 and GN Nebraska No. 1, because of their luxuriant growth on heavy soil in level areas, tend to have more white mold than GN 1140, which is earlier and has much less vine growth.

2. Pinto UI 114 also has heavy vine growth and seems more likely to have white mold. Pinto UI 111, on the other hand, is less viny and luxuriant than Pinto 114.

3. Early planting, before June 3, of GN Tara and GN Jules is recommended for lighter soils or sloped fields. When vine growth is less luxuriant, white mold tends to be less of a problem and these varieties are superior in yield to the standard varieties. Newer varieties GN Valley and GN Star also have less vine growth than Tara or Jules.

More information on white mold may be obtained in University of Nebraska Agricultural Experiment Station Bulletin No. 518 "White Mold Disease of Field Beans in Nebraska" and NebGuide G74–196 "White Mold of Dry Beans," available at County Extension offices.

Root rot is a disease which occurs in nearly all bean fields in any season and varies within a field and from year to year in severity and resulting yield loss. There are three main types of root rot—fusarium or dry root rot, rhizoctonia root rot and pythium root rot. In western Nebraska pythium and rhizoctonia types are less common and of minor importance compared with the fusarium type. Also, both pythium and rhizoctonia types can be controlled with fungicide seed treatments such as chloroneb, captan, maneb, terrechlor + terrazole and thiram.

The first symptoms of fusarium root rot are slightly reddish areas or streaks of discoloration of the normally white taproot. Under Nebraska conditions, symptoms first appear four to five weeks after planting. This reddish discoloration increases in intensity and may eventually cover the entire taproot and stem below the soil line. Later in the season the red color is replaced by a brown discoloration (Fig. 1). If the taproot of an infected bean is split open, the central pith area is often a bright red.

As a result of infection, lateral roots from the taproot are often destroyed. Throughout the season the loss of lateral feeding roots cause symptoms similar to those caused by low soil moisture.

Fusarium root rot is caused by *Fusarium solani* f. sp. *phaseoli*. This fungus is universally present in soil and survives almost indefinitely from season to season on dead, organic matter or as resting spores called chlamydospores.

There are no adequate control measures for fusarium root rot. Continuous cropping of beans increases the incidence and severity of the disease. A six to eight year rotation may help but is highly impractical for western Nebraska.

Where soil compaction is a problem, subsoiling to 22 inches (55 cm) is effective in reducing root rot damage, but precautions to avoid recompaction should be taken.

Application of nitrogen is reported to have variable effects on the severity of fusarium root rot. In general, however, dry edible beans do not respond to nitrogen. Use of bacterial inoculant is recommended in planting beans in soil not previously grown to a legume crop.

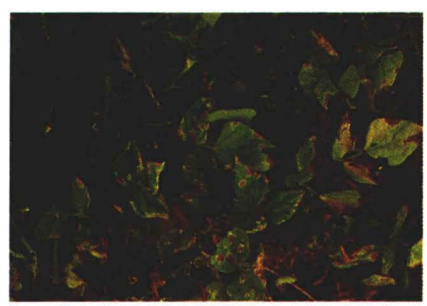
Light but frequent irrigations enable the bean plant which has lost its lower root system from root rot to produce a normal yield. Use of this practice, however, should be tempered by the grower's experience with white mold, a disease which is favored by a continuously wet soil surface.

Because no effective chemical control measures are known, breeding and selecting for disease resistance offers the best solution. A program to incorporate root rot resistance into Great Northern and Pinto bean varieties has been initiated at the University of Nebraska.

Bean rust, caused by the fungus *Uromyces phaseoli*, occurs sporadically in western Nebraska and usually develops late in the growing season. Rust commonly causes little damage and, in fact, may be advantageous in helping defoliate plants just prior to harvest time. The disease, however, did cause some grower concern in 1976 when rust

(Continued on next page)

Figure 1. (below) Symptoms of fusarium root rot are a reddish discoloration of the taproot. The red color is later replaced by a brown discoloration. Figure 2. (right) Bean rust first appears as small yellow spots on the leaves. After about 10 days, dark red rust pustules, often surrounded by a yellow halo, form in these spots. Fig. 3 (lower right) Characteristic leaf symptoms of common bacterial blight are irregular areas of brown, dead tissue surrounded by a narrow lemon yellow border.



Bean . . .

developed in early August in southwestern Nebraska and northeastern Colorado. Rust can become serious during wet years in which planting has been delayed and cool, wet weather prevails through much of the growing season. If rust develops as the beans are vining across the rows, severe losses can occur.

Symptoms of bean rust become visible 2-3 days after infection as small yellow spots on the leaves. After about 10 days dark red rust pustules (Fig. 2) develop in these spots. Each pustule is surrounded by a distinct yellow band. If touched, the red spores rub off onto your fingers, thus helping distinguish rust from other leaf spots. During the summer, rust spores are spread from plant to plant or field to field by wind.

Rust is not severe enough in Nebraska most years to warrant chemical control. This does not mean, however, that rust cannot become a problem in certain years.

If rust is developing rapidly from early bloom to four weeks before harvest, spray is needed. Early rust detection during this critical period is the key to successful control.

Table 1. Rust severity rating.

Rating	Severity
0	No rust
0+	Trace (1 spot per 100 leaves)
½	2 spots per leaf
1	10 spots per leaf
2	40 spots per leaf
3	200 spots per leaf
4	400 spots per leaf
5	Most leaves dead from rust

Table 2. Fungicide application for rust control on pinto beans based on plant maturity and rust severity (F=apply fungicide).

Plant Stage	Rust severity rating 0	½	1	2	3	4	5
Early bloom		F	F				
Full bloom		F	F				
Small pods		F	F				
Flat pod		F	F	F			
Early pod fill				F			
Early purple stripe on lower pods							
Purple stripe on most pods							
Pods and beans drying							
Harvest							

Therefore, growers should inspect fields weekly from early bloom until four weeks before harvest. A rust severity rating can be determined from Table 1.

When severity is correlated with plant maturity (Table 2) the use of a fungicide can be scheduled.

The fungicide application in relation to plant maturity in Table 2 is based on dryland conditions. We do not have similar information pertaining to irrigated beans. However, in the event of an early, severe outbreak of rust, the foregoing schedule is recommended until a similar program is developed for irrigated beans. Maneb, zineb and sulfur are registered for rust control on dry edible beans. Use fungicides according to directions.

Two bacterial blight diseases produce somewhat similar symptoms on bean plants. *Common blight* (fuscous blight) is caused by *Xanthomonas phaseoli,* and *halo blight* by *Pseudomonas phaseolicola*. Both blights are found nationwide, but in Nebraska common blight is the more serious. Symptoms of common blight are most pronounced on the leaves and can be recognized readily in the field. Characteristic leaf symptoms are irregular areas of brown, dead tissue surrounded by a narrow lemon yellow border (Fig. 3). Infected leaves appear to be scorched. Lesions form on pods as reddish, roughly circular spots.

Leaves of plants recently infected with halo blight have a characteristic yellow color. Small, water-soaked spots develop on the underside of leaves. These spots enlarge and turn reddish-brown. Under cool temperatures 70°F (21°C) the reddish-brown lesions are surrounded by a very large yellow halo, thus the name halo blight. At temperatures of about 80°F (27°C) the halo generally does not develop. Halo blight is a cool temperature disease and does not affect dry edible bean types as readily as common blight. Thus, the greater occurrence of common blight in Nebraska.

Bacterial wilt is caused by the bacterium *Corynebacterium flaccumfaciens*. The symptoms of bacterial wilt are similar to those of common blight, although wilt-infected plants are generally more stunted and wilt more readily during the day. In addition, the stems of severely infected plants may crack lengthwise and cause the plant to die. Lesions on the pods are dark green and are watersoaked. The infected seeds are yellow and usually shriveled.

Like common bacterial blight, bacterial wilt grows in warm, moist conditions. The bacteria are spread by splashing rain, hail, irrigation water, infested plant debris, windblown soil, animals and cultivation equipment and may be carried on or inside the seed coat. Plants from internally infected seed are yellow, stunted and progressively die. A few diseased plants in a field will infect neighboring plants. Bacteria enter the plant through natural openings and wounds and through infected seed.

Controls for bacterial blight and wilt are as follows: 1) Plant only certified seed; 2) the bacteria survive two years in crop debris; to eliminate this source of infection, use a three-year rotation and avoid planting near previously blighted fields where debris could blow in; 3) seed treatment with streptomycin only eliminates the bacterial contamination on the seed coat but has no effect on internally-borne bacteria; 4) copper sprays or dusts applied to the foliage have only limited value; 5) cultivation, spraying, or other field operations when the foliage is wet should be avoided until leaves are dry; and 6) use varieties such as GN Star and GN Valley that are tolerant to common bacterial blight and wilt. GN Emerson is tolerant to wilt and GN Tara and GN Jules are tolerant to common blight.

More information on dry edible bean production is given in University of Nebraska Agricultural Experiment Station Bulletin, SB 527 "Growing Dry Edible Beans in Nebraska," available at County Extension offices.□

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Pest Center Serves Growers, Gardeners

By Jack Riesselman, Tim Miller and John Furrer

Most people are familiar with the term "pest" as it relates to plant injury. Many people can even recognize some of the common plant diseases, harmful insects and unwanted weeds. However, it is difficult for most people to identify just what pest is present and what they can do about it. Furthermore, some terms, such as disease losses, economic insect levels, weed competition and methods of control, are difficult for many people to understand.

For these reasons the University of Nebraska Cooperative Extension Service offers the help of diagnostic clinics or pest identification and control centers. These help the grower and the home gardener identify their problems and determine the economic importance.

Although the diagnostic laboratories or pest control centers are fairly new, the concept of identifying pests and devising methods to control them is not. In Nebraska, this service began in the 1870s when Samuel L. Aughey, a Lutheran minister from Sioux City, Iowa, was appointed professor of Natural Science at the University of Nebraska. His responsibilities included identifying insects and plants and, when necessary, providing help or suggestions. Another of his early duties was to analyze beer and patent medicines. This service is no longer provided by the diagnostic clinics, however.

The science of pest control began to take a more disciplined approach in the late 1880s when Professor Lawrence Bruner initiated research on grasshoppers and other insect pests common to Nebraska. His pioneering work on insects and their control has been mentioned in Marie Sandoz's early writings on Nebraska history.

In 1923 Dr. Robert Goss established the first plant disease clinic in Nebraska. From these modest beginnings, the science of pest identification and control has grown steadily. Today more than 7,000 samples and inquiries are processed annually by personnel in Plant Pathology, Entomology, Horticulture and Weed Science.

Many types of people have used the pest identification centers since they began. From the beginning a major emphasis of these clinics has been to help farmers identify and control economic pests. In the past 50 years, approximately 30 percent of the samples received dealt directly with field crops.

In certain years when specific problems appear, such as the southern corn blight epidemic, stem rust outbreaks, or alfalfa weevil infestations, the respective number of samples received increases greatly. For instance, in 1971, the year following the southern corn leaf blight epidemic, the plant disease clinic had a threefold increase in the number of corn samples submitted.

Interest in gardening and ornamental plants has increased at an astounding rate during the past decade. This urban "green revolution" has brought with it many new and unusual problems in pest identification and control. In the past 10 years approximately 70 percent of all pest samples submitted have come from vegetable gardeners, flower producers, fruit growers, house plant en-

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Pest . . .

thusiasts and homeowners.

In some cases there has been little or no research on the pests involved, or the pest has been rare in our area. For instance, a scorpion was accidentally shipped to Nebraska in a box of material from a manufacturing plant in the southwest. The worker who unpacked the shipment was stung and the entomology specialists were called upon by the attending physician to identify the scorpion and the proper treatment required.

As interest in growing plants continues to increase, we anticipate more and more problems with old and new pests. Therefore, the number of people who use this service will undoubtedly increase. This not only allows us to help the individual who has the problem but it also helps us monitor new pests which may become important in Nebraska.

The local county Extension office is often the first contact for a person whose pest is ultimately submitted to the diagnostic clinics. Most pests are identified at the local level and control procedures are suggested. However, if the county Extension agent does not recognize the problem or feels he lacks expertise in the area, he then submits the sample to the respective diagnostic center.

Along with the sample, the county agent supplies other useful information about the pest. This may include the degree of injury, overall occurrence, cropping history, varieties involved and any other information that might be important to identifying and controlling the problem.

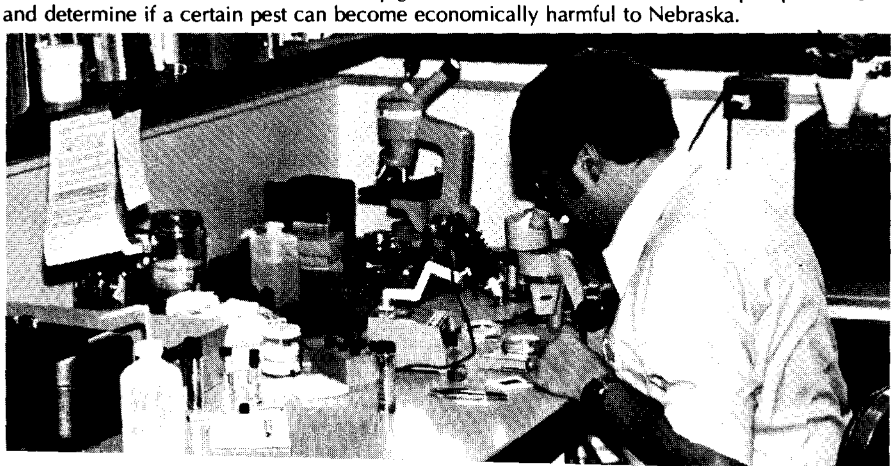
The pest is often identified by visual or taxonomic characteristics or by culture techniques when necessary. With some samples, extensive equipment may be needed to identify the problem. For example, the electron microscope—capable of magnifying an object 100,000 times its actual size—is used to identify certain virus diseases.

Once the problem is identified, the information supplied with the sample is analyzed to determine if the problem is economically important. If it is, a recommendation on controlling the pest is made. This may mean using selected chemicals, timing of chemical applications, recommending varieties resistant to the pest, suggesting changes in cultural procedures, or a combination of these to control the pest. By determining the severity of the problem, the pest identification and control centers help avoid costly and unnecessary use of chemicals which could endanger the environment.

In some cases it is necessary to identify a pest or make recommendations over the telephone. Although this is not an ideal way, it often is necessary. Some controls need to be applied immediately, before the pest reaches an economic threshold, and cannot be delayed the three to four days necessary to process the sample. By using information gathered from samples submitted in the past for diagnosis and by drawing upon the expertise of staff members in each department, the identification and subsequent recommendations often can be made with a high degree of accuracy.

In addition to providing a direct service to Nebraskans, the pest identification services also function as survey or monitoring units which help keep up with pest activities in the state. Because it is physically impossible to survey and monitor the entire state, we rely on samples submitted from throughout the state to help evaluate the severity and distribution of a given pest.

Pest identification and control centers help gardeners and farmers deal with their pest problems and determine if a certain pest can become economically harmful to Nebraska.



For instance, there have been two extremely serious outbreaks of wheat streak mosaic virus here since 1950. By examining the increased number of virus-infected wheat samples submitted in those years, we can readily see how the diagnostic centers can serve as survey and monitoring units.

The spread of certain pests can be traced by samples submitted to the pest control center. For instance, the weed science center first identified and now monitors sickleweed in northeast Nebraska through samples submitted from that area, and also through the cooperation of local weed control authorities.

Occasionally, an unusual and serious pest could cause serious economic damage to the state. This was the case when a plant called Halogeton was submitted to the weed identification center. Halogeton can produce soluble oxalates that are extremely poisonous to livestock. Fortunately, the weed was identified early. It was growing as a garden curiosity and subsequently wiped out.

The Cooperative Extension Service of the Institute of Agriculture and Natural Resources, University of Nebraska, offers this pest identification service to the public at no charge. Insects, weeds and plant diseases are identified by Extension Entomologists (Room 201 Plant Industry Building), Extension Weed Science Specialists (Keim Hall), Extension Plant Pathologists (Room 305 Plant Industry Building), and Extension Horticulturists (Room 105 Plant Industry Building), respectively. All of these offices are located on the East Campus, University of Nebraska, Lincoln, Nebraska 68583.

In addition to the four mentioned locations a similar service exists at most district experiment stations.□

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JOINT VENTURE

BEEF FABRICATION

An answer for the small beef packer?

By J.C. Hafer and J.G. Kendrick

The small beef packer faces many problems when considering a move toward beef fabrication. Yet he also faces competitive conditions that force him to improve his performance and strength in the marketplace.

In 1974, the four largest federally inspected (FI) plants in Nebraska accounted for 40.5 percent of the state's total cattle slaughtered under federal inspection. This left 59.5 percent to be slaughtered by the remaining 30 FI plants; and these larger plants are fabricating at least a part of the beef they slaughter.

Beef fabrication, sometimes called "boxed beef," is the process of breaking down beef carcasses to sub-primal cuts, such as short loins, rounds or square cut chucks.

Because of their size of operation and the large amount of capital required for fabrication, these larger plants may enjoy a decided business advantage.

One solution for the small packers is to form a jointly owned beef fabricating company. This would allow boxed beef technology at an economical production level, spreading the costs and risks proportionately. When asked their views on trends towards boxed beef, an overwhelming majority (81 percent) of small packers saw a shift to this procedure (See "Small Beef Packers Undergo Changes," Spring 1977 issue). Better inventory control, labor and space savings, and sanitation were cited as reasons.

Figure 1 shows the flow of beef through a fabrication process. It is a complex procedure that requires coordination of steps for smooth operation. Efficient beef fabricating occurs at a productive capacity of at least 60 head per hour.

In South Central Nebraska during 1974 there were more than 550,000 cattle slaughtered, mostly steers and heifers. A fabricating process requiring 113,000 head (60 head/hour), would have taken only 20 percent of the total, leaving 80 percent to be marketed through established channels. The impact of this is that fabrication could be introduced without a severe disruption of existing marketing channels.

The expected cost to cover annual fixed and variable expenses for a 60-head-per-hour beef fabrication operation would be approximately $2 million per year.[1] In addition, a processing line and the necessary sanitation equipment would mean hiring between 60 and 75 skilled and semi-skilled people.

Crucial to the organization of a jointly owned company is a commitment on the part of the owner-contributors to supply a steady flow of the right number and type of cattle.

The venture could be established with the proportion of contributions dictating the fraction of ownership and distribution of profits. For example, if four packers jointly established a fabricating company, each owning 25 percent, then profits, investment requirements, risk and supply would be equally divided.

Assuming the four contributing packers had slaughtering capacity of 31, 38, 44 and 35 head per hour respectively, a possible contribution to the pre-fab operation on an average daily basis would be as shown in Table 1.

The small packer will feel competitive pressure from existing boxed beef fabricators, and from retailers wanting to reduce their meat department costs. A joint fabricating venture among several small packers could be the solution to this competitive pressure.

Because of high initial and operating costs, one impact of beef

[1]Based on an average cost of $16.34 per head (1975 figures) and accounting for the annual cost of equipment, purchased new, and constructing a building costing approximately $52 per square foot.

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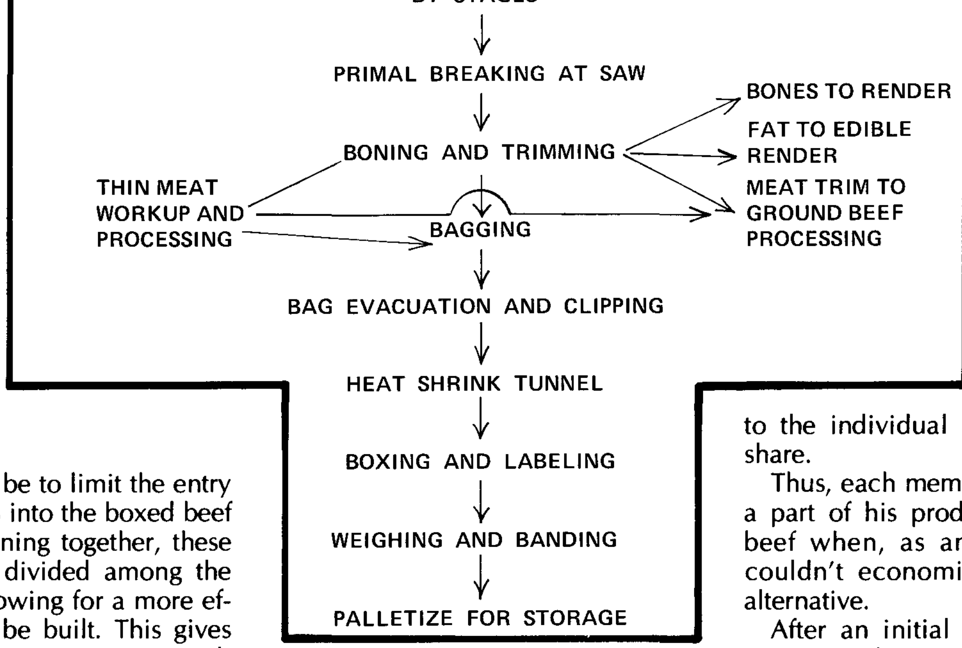

FIGURE 1

SCHEMATIC DIAGRAM OF THE BEEF FABRICATION BY STAGES

Joint . . .

fabrication may be to limit the entry of small packers into the boxed beef business. By joining together, these costs could be divided among the participants, allowing for a more efficient plant to be built. This gives the joint venture a competitive advantage over the small individual fabricator and increases the firm's profit potential.

Small packers could realize greater profits by developing a coordinated marketing program. Their purchasing decisions on both cattle and other inputs would thus be coordinated through the joint company. The portion of the production marketed jointly would reduce the between-firm competition and promote a more coordinated marketing effort of the members.

This coordinated marketing effort could result in a merchandising program similar to that of large fabricators, yet unique in its service, delivery, packing, etc. The approach could be aimed at the small retailers of the local region.

The jointly owned facility could develop a merchandising program for distant markets as well. Individually, the members may not have been able to generate enough volume to sell to the large retail chains or ship into the coastal markets. However, these markets could become accessible through coordination. For example, suppose a heavy-cattle (700 to 900 lb. carcass) market exists in the East. The individual packer may receive these cattle but have neither the volume nor the outlets to effectively merchandise them. A joint company could combine enough of these cattle from its members to merchandise the cattle where they bring the highest price. This means heavy beef that might otherwise have been sold at a discount, can effectively contribute to the individual member's profit-share.

Thus, each member could market a part of his production as boxed beef when, as an individual, he couldn't economically afford this alternative.

After an initial ownership commitment of 25 percent (as in the example) in capital and carcass beef, fluctuations in production and distribution could result in the actual contribution being slightly different from anticipated. Thus, profits would be adjusted proportionately.

The smaller packers could use the latest beef fabricating technology individually. However, acting independently they would face higher per unit production costs than their larger competitors.

By operating as a joint venture, the small packer may be more competitive in terms of product and price with the large operators. By sharing risk, costs and profits proportionately the smaller packer can use the latest technology. To be most successful, location in an area where small independent beef slaughterers are concentrated (such as south central and extreme eastern Nebraska) is ideal.

Thus a joint venture into fabrication could offer small packers a chance to break the high-cost entry barriers of the technology and to maintain a competition in an industry of predominantly large firms.☐

Table 1. Possible contribution to the pre-fabrication operation on an average daily basis.

Owner	Average Slaughter Capacity	Daily Contribution from Slaughter*	Percentage of Contribution of FAB**
1	31	96 hd., 1½ loads	21.2%
2	38	117 hd., 2 loads	25.6%
3	44	135 hd., 2¼ loads	29.6%
4	35	108 hd., 1¾ loads	23.6%
	148	456 hd., 7.5 loads	100%

* Arrived at by (slaughter capacity) (41%) (7.5 hrs/day).
41% = 60/148

** Daily contribution from slaughter/450 hd. required.

After an initial ownership commitment of 25 percent in capital and carcass beef, fluctuations in production and distribution of profits could result in the actual contribution being slightly different from the anitcipated contribution.

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Rural Services: Worth the Cost?

Western Nebraskans were asked if they're receiving their money's worth from various services.

By Gayle Ann Morris and P. H. Gessaman

Are rural Nebraskans satisfied with their return from community service expenditures? Does the place of residence and level of income affect the way a person feels about community services?

These two questions were addressed in part by a survey taken in three western Nebraska counties in spring 1975. People from 407 households in Sioux, Cheyenne and Scotts Bluff Counties were interviewed. Generally, these rural Nebraskans felt they did receive their money's worth from community services. Neither the location of residence nor level of income consistently affected the answers to the survey questions.

The people interviewed were asked whether they were satisfied with their return from expenditures on these seven community services: water supply, sewage disposal, solid waste disposal, fire protection, law enforcement, education, and health care.

Answers were analyzed according to the income level and location of the households interviewed. Interviewers estimated each household's income based on their personal observations and knowledge of the household and area. Estimates were classified into one of three categories: Low (less than $5,000), Medium ($5,000 to $14,999), and High ($15,000 or more).

The place of residence was divided into two general categories—municipal and open country (people who do not live in towns).

For each of the seven services the households were asked to answer "yes," "no," or "don't know" to the question: "Are you getting your money's worth from what you spend on ________ (service)?" An answer of "yes" was interpreted as satisfaction with the return received from money spent on a particular service. A "no" response was interpreted as dissatisfaction with the return from money spent on a certain community service. The interview form did not include questions to

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Table 1. Responses to, "Are you getting your money's worth from what you spend on law enforcement, education, and health care"? by place of residence and income category, three Nebraska counties.

Place of Residence	Income Category[a]	Yes	No	Don't Know
		Percentage		
LAW ENFORCEMENT				
Municipal	Low	90	3	7
	Medium	70	8	22
	High	91	9	0
Open Country	Low	68	18	14
	Medium	67	11	22
	High	68	19	14
EDUCATION				
Municipal	Low	32	11	67
	Medium	50	21	30
	High	75	12	13
Open Country	Low	57	25	18
	Medium	61	18	21
	High	59	18	24
HEALTH CARE				
Municipal	Low	79	7	14
	Medium	76	12	13
	High	88	8	4
Open Country	Low	74	19	7
	Medium	78	11	11
	High	77	12	12

[a]Income categories are: Low (<$5,000), Medium ($5,000-$14,999), and High ($15,000 or more).

Services . . .

determine why those responding "don't know" chose that answer.

How did these households feel about what they spent for water, sewage disposal, solid waste disposal and fire protection? A high percentage of "yes" answers was recorded for all three income groups in both the municipal and open country categories. For most of these services fewer than five percent of the households answered "no," The percentage of people who answered "don't know" was different for each service, but usually a small percentage. Overall, it was concluded that most respondents were satisfied with the return from money spent on these four services.

Responses were different for the services of law enforcement, education and health care. Why? There are at least two probable reasons: (1) there is more person-to-person contact with these three services, and (2) decisions about who receives these services, and how much of each, can be heated issues.

LAW ENFORCEMENT. Table 1 displays the results for the people who answered the question "Are you getting your money's worth from law enforcement?" People who lived in a municipal area answered "yes" more frequently than people in the open country. The open country respondents more often answered "no" and "don't know." Respondents in a municipal area apparently were more satisfied with their return from money spent on law enforcement than were those who lived in the open country.

EDUCATION. The results from the question "Are you getting your money's worth from education?" are also reported in Table I. Overall, people who lived in the open country answered "yes" more frequently than people who lived in a municipal area. Special notice should be taken of the low level of satisfaction expressed by low income people in the municipal area. High percentages of "no" and "don't know" responses were recorded for all income categories in municipal and open country areas.

HEALTH CARE. The responses people gave when asked, "Are you getting your money's worth from health care services?" are in the third section of Table 1. The pattern of answers for health care was similar for all three income levels in the municipal and open country categories.

Comparing the three services of law enforcement, education and health care, it appeared that municipal respondents were the most satisfied with their return from money spent on law enforcement. They were the least satisfied with their return from education.

People who lived in the open country were the most satisfied with their return from health care services, and the least satisfied with their return from money spent on education.

Are rural Nebraskans receiving their money's worth from community services? Data from three rural Nebraska counties indicated "yes," respondents felt they generally were.

Does a person's place of residence and level of income affect the way he or she feels about their return from community service expenditures? For the seven services taken as a group, the answer for rural residents of Cheyenne, Scotts Bluff and Sioux counties appeared to be "no." Based on a person's income level and place of residence, no consistent pattern of responses was apparent for these seven services. This implies that other factors, such as local conditions, have a greater influence on how people view their return from expenditures on community services than does either their level of income or their place of residence.□

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Further information is contained in the following publications: "Consumer Satisfaction with the Return . . ." Gayle Ann Morris Agricultural Economics Staff Paper 1977-4, and the individual county survey reports written by P. H. Gessaman "User Perceptions of Selected Community Services ________ (county)" Mimeo Reports, 1976.