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Many Producers Will Have Inadequate Feed Supplies

Joe W. Rust

Many dairy and beef producers in northeast and north central Minnesota will find this year's forage supply to be short and low in quality. The cooler and wetter weather conditions this summer were responsible for this problem. Hay harvest was delayed in many cases due to continued rains. The result was more mature forage which is higher in fiber and lower in protein and energy content. The wet weather presents a further problem when hay was rained on after cutting. In some cases rain continued for an extended period so that some hay was no longer fit for livestock feed. The open winter experienced last winter resulted in some winterkill and loss of alfalfa stands especially in the central tier of counties of Minnesota. Farmers depending on corn or corn silage as part of their feed supply in the northern counties found reduced yields or an immature crop.

Once the summer is over and the available feed supply is stored, what should be our strategy for feeding when our forage is low in quality and short in amount. It might be helpful to take an inventory of the available feed supply early in the winter feeding period. This will help you to decide how to allocate the

various lots of feed to different classes of livestock and to decide what supplements will be necessary. The best quality forage should be reserved for young stock and lactating cows. The more mature and rained-on hay may be adequate for dry beef cows if they are provided adequate Vitamin A and mineral supplementation. Once these cows are nursing their calves later this winter and spring they require at least one-third more energy and protein. This would be the time to feed the best hay that is available and/or provide some grain and protein supplement. Young growing calves, especially those under 700 pounds, should be fed the better quality hay. More supplemental grain may be necessary than you are accustomed to feeding in previous years.

If you find it necessary to purchase feed, pay particular attention to the kind and quality of feed you purchase as well as the price. Many times good quality hay is definitely the best buy even though the price per ton is somewhat higher. Low quality hay is almost never a good buy if it is to be fed to lactating dairy or beef cows or young calves. If you shop around this year, you may find that you can purchase more energy and

protein in the form of grain and soy bean meal than as hay. It would be helpful to sample and analyze forage for protein, fiber and TDN so you can balance the ration more accurately. If you are short of feed you may want to take a good look at how many animals you should keep. This would be a good time to cull low producing cows. If you haven't been checking your beef cows for pregnancy, this may be a good time to start. There is no profit in feeding a cow all winter if she isn't going to have a calf.

Potential for Close Spacing of Broccoli and Cauliflower

David K. Wildung

As recently as 1981 we suggested that both broccoli and cauliflower be planted at an 18-inch in-row spacing or a density of about 10,000 plants per acre. In 1982, a series of plant spacing experiments was initiated. A 12-inch spacing was tried successfully in 1982. In 1983; 6, 12 and 18-inch spacing were compared at different fertility levels. In 1984, only the 6-inch spacing was evaluated at four different fertility levels. The 6-inch spacing offers a density of about 30,000 plants per acre which is still below many of the high density bed plantings currently being used in the major California production areas. The objectives of the 1984 study were first to determine if cauliflower and broccoli could be successfully grown at a 6-inch in-row spacing and second to determine what rate of fertilization was best for cauliflower and broccoli at the 6-inch in-row spacing. This article presents the results of the 1984 study.

Andes cauliflower and Southern Comet broccoli transplants were planted in the field on June 11 at a spacing of 6 inches between plants in the row and rows 3 feet apart. Ammonium nitrate fertilizer was applied at the rates of 50, 100, 150 or 200 pounds of actual N per acre. The fertilizer



A core sample taken from 20 bales of hay can provide a representative sample for estimating the feeding value of a lot of hay.

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Potential for Close Spacing of Broccoli and Cauliflower

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was banded with one-third being applied at planting, one-third two weeks after planting and one-third four weeks after planting. Normal cultural practices were conducted and the heads were harvested when they reached maturity. Data collected on each treatment included date of harvest, average head size and whether marketable or not. From the yields, a marketable yield per acre was calculated. The results of this experiment are presented in Tables 1 and 2.

As Table 1 indicates, there was little difference in maturity among the nitrogen rates with Southern Comet broccoli. Head size also was quite similar. The percent of marketable heads decreased as the fertility level increased probably due to looser head formation. The marketable yield per acre was greatest for the 50 lb actual N treatment. With Andes cauliflower, there were differences in the average harvest date. Maturity seemed to be related to curd size with the largest curd sizes being slowest to mature. There were differences in the percent of marketable curds and yield but no definite trend seemed to be apparent. Curd size was greatest at the 200 lb actual N rate and may indicate that higher N levels will produce larger curds. However, even the 50 lb N rate produced an adequate curd.

From this study it would appear that both Southern Comet broccoli and Andes cauliflower can be grown successfully at a 6-inch in-row spacing. Further, it appears that nitrogen rates as low as 50 lbs of actual N per acre appear adequate for obtaining a good crop. For Southern Comet broc-

Table 1. Effect of nitrogen application on Southern Comet broccoli planted at a 6-inch in-row spacing.

Fertilizer rate (lbs N/A)	Avg harvest date	Percent marketable	Avg head size (lbs)	Marketable yield (1000 lb/A)
50	8/4	100	0.80	23.23
100	8/4	83	0.69	16.63
150	8/5	90	0.73	18.51
200	8/4	76	0.78	14.98

Table 2. Effect of nitrogen application on Andes cauliflower planted at a 6-inch in-row spacing.

Fertilizer rate (lbs N/A)	Avg harvest date	Percent marketable	Avg curd size (lbs)	Marketable yield (1000 lb/A)
50	8/28	90	1.70	31.10
100	8/28	74	1.80	24.37
150	8/24	90	1.74	31.83
200	9/4	80	2.01	31.29

coli additional nitrogen fertilizer would not appear necessary. For Andes cauliflower additional nitrogen fertilizer would not appear necessary unless larger curd size was desired.

Fertilizer requirements will vary depending upon soil type, rainfall and irrigation used. The fertility levels become more critical with higher plant densities. As a grower considers higher density populations the need for soil testing and foliar analysis probably will become more necessary. As plant densities increase transplant costs also increase but the productivity obtained from higher densities would seem to warrant the additional transplant cost. Before a grower switches entirely to a high density planting system he will want to evaluate the system under his conditions on a trial basis. However, there seems

to be enough merit in a 6-inch in-row spacing or in high density bed plantings to warrant their further evaluation under northern Minnesota conditions.

ASAE Summer Meeting Report

James J. Boedicker

One of the responsibilities of a scientist is to keep abreast of developments elsewhere that are pertinent to his own research interests. One of the ways he does this is attending seminars and other meetings at which research findings are presented and discussed. As a change of pace from more usual topics, I thought readers might be interested in a report of one such meeting I attended this past June, the annual summer meeting of the American Society of Agricultural Engineers (ASAE). In many ways, it was probably typical of meetings of other professional societies attended periodically by researchers at this station.

The site of this year's ASAE summer meeting was the campus of Michigan State University in East Lansing. The four-day event drew over 1,100 agricultural engineers from all over the world, including representatives from academic institutions, government and industry.

The main part of the program consisted of numerous technical sessions in which a total of nearly 400 research papers were presented. Papers covered practically the full range of subject matter in which agricultural engineers are involved. The papers were grouped by subject matter and presented in sessions of 5 to 7 papers, each with as many as 12 such sessions running concurrently both morning and afternoon. At such large meetings,



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ASAE Summer Meeting Report

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one tries to select and attend sessions on topics that most closely match his work interests or will otherwise be most valuable, but sometimes two or more sessions are equally appealing and deciding can be difficult.

Topics of some of the sessions I attended at the meeting were: Forage Harvesting and Drying, Trickle Irrigation, Equipment and Techniques for Improved Chemical Application, and Environmental Control Options for Livestock and Poultry. One of the papers given under this last topic entitled "Effects of Below-Normal Minimum Ventilation Rates on Early Weaned Piglets," was presented by Dr. Larry Jacobson, extension agricultural engineer at the University of Minnesota in St. Paul. This paper described recent work conducted both at the experiment station at Rosemount and at this station, which showed no significant adverse effects on performance and health of early weaned pigs as a result of subjecting animals to lower than recommended minimum ventilation rates in winter. (Additional work on swine nursery ventilation and air quality is presently underway at this station and will be discussed in a future issue.) During a break in the session I had the opportunity to discuss with some of the country's leading swine housing experts plans for the sow gestation and breeding facility that is presently being remodeled here at the North Central Experiment Station.

Sandwiched into the daily schedule of technical session were general sessions, some featuring distinguished speakers on agriculture related topics of interest to most everyone at the meeting. R. W. Lundeen, Board Chairman of Dow Chemical, spoke on "Meeting the Needs of Crop Chemical Delivery Systems in the '80s and Beyond." W. E. LaMothe, Chairman and Chief Executive Officer of Kellogg Company discussed "The Future of Grain Based Food Products," both domestically and worldwide. These speakers gave stimulating and highly informative presentations, both touching on the current farm crisis and on worldwide food delivery systems.

Another important activity that takes place at such meetings is the "committee meeting." ASAE has over 250 committees and sub-committees that deal with nearly every subject of interest to the society and the agricultural engineering profession. Many committee meetings were scheduled each day, some beginning as early as 6:00 a.m. with others lasting beyond midnight. One such committee is the Power and Machinery Standards Committee. Over the years, this committee has been largely responsible for the level of standardization and interchangeability that now exists among tractors and equipment manufactured by different companies.

Other ways of keeping up with developments in one's field are through direct interaction with other researchers and study of the scientific literature. These, together with participation in technical meetings, help stimulate new and fresh ideas, minimize redundant or otherwise unproductive research, stimulate cooperative research efforts and generally enhance the quality and value of research that is conducted.

Thinning, A Forest Management Tool

Bill Cromell

Fall is with us, and many owners of forestland set aside time to perform some kind of improvement on their forested acres.

Whether it be a natural stand or a plantation, a good sound management concept that usually applies is thinning. It is not complicated or difficult to implement, and in my opinion is the most beneficial cultural method the owner can apply. In brief, thinning means cutting some trees in immature stands to increase growth of the remaining stems and total yield or value of usable wood. Thinning is usually carried out on even-aged stands where trees are approximately the same age, but can be useful and beneficial to other types of stands. All forest management concepts are flexible. When thinning, if the trees removed pay the thinning costs, it is called a commercial thin. If the material removed is small and does not offer enough return to pay the immediate thinning costs, it is termed a pre-commercial thin. In a pre-commercial thin you have a delayed return that will be realized from additional wood that the residual stand will acquire by reducing competition during its growing years.

Two main objectives can be met by a good thinning program. First you are able to sell trees that otherwise may die and decay. The second objective is to redistribute the total growth on fewer trees of higher quality; growth will be stimulated on the better more vigorous remaining trees. The healthy tree will reach a larger diameter faster, and offer a maximum dollar return on a shorter rotation.

In order to understand the concept of thinning, I want to make a few remarks as to how a tree grows, especially in groups. I want to touch on some of the basic growth patterns of a tree. First, a tree is a living thing and all living things grow by forming new cells. In a tree these new cells are formed in a layer called the cambium. This layer is located just inside the bark of the tree. This growing or cambium layer made up of microscopic cells is found over the entire tree, even in the roots. Right next to this layer are located other special cells that make up the tree's



1952 Red pine Experiment Station plantation. Utilized for crop tree pruning study. Thinned 1972 and 1978.

transportation network. Small root hairs are located on the larger roots. They absorb water and minerals that are moved upward in the tree through special cells called xylem, more commonly known as sapwood. All the food for the tree is made in the leaves or needles and is moved downward in yet another special group of cells located between the cambium and the bark, called phloem tissue. I mention these special cell groups to emphasize the fact that a tree is very complex. It has special cells where growth originates, special layers to move water and minerals up from the roots and yet another layer to move the wood manufactured in the leaves to all parts of the tree. These layers of special cells grow best when the tree has suitable space to develop. Thinning is a means of providing the required space.

Thinning timber stands is aimed at increasing diameter, rather than height. All height growth is derived from the terminal bud. In general over a wide range of tree densities, height growth is affected very little by thinning. Another consideration related to thinning is that response varies with age for most species. Where a stand is nearing its rotation age or maturity, little value will be gained from thinning. Young immature stands should be the target for thinning.

Thinning should begin early in the life of the stand, when the trees are 10 to 20 years old. The age, along with the density of the stand, dictates when to thin. An often used rule of thumb as to when a stand should be thinned is when crowns of adjacent trees begin to touch. Intervals between thinning vary a great deal. They commonly range from 5 to 15 years.

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Thinning, A Forest Management Tool

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I want to indicate again that thinning is the chief stand management tool available to woodland owners, both large and small. I would advise that if you have a forested area, wild or planted, that appears to have excess stems that are competing for space and you want to improve growing conditions but are in doubt as to what you should do, seek advice. Assistance with your problem can be obtained from your local county agent office. The DNR also has a private woodland assistance program.

Time and money you spend now to improve your forest increases the volume and values of your timber. Good healthy improved forests also increase the value of your property if you decide to sell. Thinning and other forestry cultural practices applied to the tree crop are a good investment.

The University of Minnesota North Central Experiment Station here at Grand Rapids has many plantations that have been thinned both on a commercial and non-commercial basis. Stop out and we can visit and look over some of our projects.

Reunion News

The All Class Aggie Reunion was held on July 20, 1985, at the Holiday Inn in Grand Rapids. Even though the acoustics were bad at the banquet, the food and visiting were enjoyed by the 140 guests and Aggies who attended.

It was voted to have the next All Class Aggie Reunion in three years (1988). Hugh Rieger, Jim Dethloff, Tom Carpenter, Lonnie Ross, Ron Bailey, Vernon Strom, Dan Carey and Bud Lacher were elected as the new reunion committee.

The new superintendent of the North Central Experiment Station, Dr. Robert Nyvall, and former superintendents Joe W. Rust and Don Dailey spoke to the group. We hope to see you again in three years.

Bob Frick

Robert F. Nyvall, Supt.

The summer and fall have been a busy time here at the North Central Experiment Station. We have some new personnel on the Station and some changes in the duties of present personnel. Bill Creamer is our new junior scientist in animal science, replacing John Roach. John left us to join the Extension Service in Wisconsin as a dairy specialist. Bill comes to us from the West Central Experiment Station at Morris. Dan Buchman has joined our forestry crew replacing Jim Underwood. Jim is now our maintenance person for the administration building. Bill Prickett is temporarily helping out on our maintenance crew until our hog barn is completed. Other changes that have occurred are the switch of Terry Hanson from the swine to the dairy barn and Tom Carey from maintenance to the swine barn. A couple of "old-timers" have indicated retirement plans; these will be announced in later *Quarterlies* when they become final.

Several other changes have occurred since the last *Quarterly*. New signs at both our driveways identify us as the "University of Minnesota, North Central Experiment Station." The signs also say "Visitors Welcome." We also have a new sign in front of our administration building, our horticulture area and on our barns. Along with the new signs we hope to increase our visibility with a new newspaper column in the Grand Rapids paper. This comes out about every two weeks and describes activities on the station. Our people are wearing caps with our identification and we are sponsoring a bowling team. An in-house newsletter attempts to keep station personnel informed of station news.

The big event, at least for me, in October was a regular monthly meeting of the University of Minnesota Board of Regents in Grand Rapids. I had the opportunity to speak for an hour on branch stations in general and North Central in particular. We have also been given permission to purchase 202 acres of land just south of Grand Rapids. "North Central South" relieves us somewhat of the

dependency on leased land and allows us to do experiments on a larger, long-term basis.

Action will soon be taken on the Superintendent's house. This building has been part of the station since 1932. However, it is now a vacant building that will likely not be used in the future. Our tentative plans are for the building to be sold and moved off the grounds. That will be a sad day but probably inevitable.

Coming Events

Dairymans Day
Wednesday, January 15, 1986

Beef Cow-Calf Day
Wednesday, January 29, 1986

Visitors Day
Thursday, July 17, 1986

Horticulture Night
Wednesday, August 27, 1986



Warmest Season's

Greetings

from the Staff at the

North Central

Experiment

Station



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