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Apple Cultivars for Northern Minnesota

David K. Wildung

As spring approaches one of the most frequent requests for information I receive is on which apple cultivars will do well in northern Minnesota. Everyone enjoys apples and the prospect of growing your own is appealing to many homeowners.

Apple growing in northern Minnesota is difficult at best. Winter minimum temperatures of −35 degrees F and lower for extended lengths of time are damaging to apple trees. Extremely cold winters or unusually cold conditions that cause winter injury to apple trees are called test winters. Test winters seem to occur in northern Minnesota every 4 to 5 years. The history of our Experiment Station orchard is such that about the time the trees recover from the last test winter another one occurs to weaken trees further.

There are two major types of winter damage that frequently occur in northern Minnesota. One is sunscald which affects most smooth barked trees. Sunscald occurs in late winter or early spring on sunny days when the air temperature remains below freezing but the sun may warm the tree bark above freezing. Then when the sun sets or is shaded the tree bark cools rapidly and may slit or crack open causing damage. Sunscald usually occurs on the main trunk or lower scaffold branches just above the snow line on the south or southwest side of the tree. It can be prevented or reduced by shading or wrapping the tree. The other type of winter injury is blackheart that is the result of outright cold injury. There is little protection for this type of injury unless you can physically warm the tree during the extremely cold time. The severity of damage depends on how cold it actually gets, how long the cold lasts and upon the stage of growth the plant is at when the damage occurs. When severe, the wood and bark may die killing the tree. When mild, the wood may only be slightly discolored. This type of winter damage over time may cause the internal wood to become brittle, punky and darkened (blackheart). Damaged wood is susceptible to secondary rotting organisms. The brittle wood is not as strong structurally and blackheart damaged trees frequently suffer broken branches especially when loaded with fruit.

Young trees are especially susceptible to winter injury because of their smooth bark and normal rapid growth rate during establishment. As the tree matures it generally develops a somewhat rougher bark and its growth rate slows making it somewhat less likely to be winter injured. On a ten-year-old tree winter injury may have occurred when the tree was very young and during other test winters. While not severe enough to kill the tree, the injury may be enough to weaken the tree so it is slow growing and unproductive. Over time the tree may die completely. Because of this cumulative effect, I consider tree fruits to be rather short lived trees in northern Minnesota. While it is certainly possible to find productive trees that are over 15 to 20 years of age, I consider the more normal life expectancy to be in the range of 8 to 12 years. With this thought in mind tree fruit growing in northern Minnesota should be viewed as a hobby and enjoyed for that reason and not as an essential part of your food raising activities. When grown as a hobby you should be able to enjoy some excellent quality fruit in the process.

There are some very good quality apple cultivars developed in colder climates that have a good chance of success. The table lists the characteristics of some of the hardier cultivars. Most of these should be available through Minnesota nurseries. Your County Extension office also has information on cultivars for the area (Fact Sheet Ag-FS-1104 Fruits for Minnesota and AG-FO-1111 Apples for Minnesota). While apple growing can be a challenge in northern Minnesota, it can also provide a lot of enjoyment and personal satisfaction.

Rescue Crab, extremely hardy, very productive.

Brittle internal wood caused by winter damage (blackheart).

HARDIER APPLES FOR NORTHERN MINNESOTA

CULTIVAR	RIPENING DATE	COLOR	CHARACTERISTICS	USE
I. LARGE FRUITED TYPES				
Mantet	8/10	bright red, attractive	juicy, tangy mild flavor, poor storage, 2½ - 2¾"	fresh, sauce, pie
Red Melba	8/15	bright red	bruises easily, short storage, 2½ - 2¾", juicy, very white flesh, mildly acid, good quality	fresh, sauce

continued on next page

CULTIVAR	RIPENING DATE	COLOR	CHARACTERISTICS	USE
Duchess	8/20	full dark red	flat shape, 2¼ - 2¾", poor storage, acid, tart flavor	pie, sauce
Oriole	8/23	striped red, not outstanding	rough, large, up to 4", poor storage, good quality, mild	pie, sauce
State Fair	8/24	bright cherry red, very attractive	conic, 2¼ - 3", mildly acid, good quality, fair storage, crisp	fresh
Beacon	9/1	dark full red	fair quality, sub acid, sometimes tough and woody, fair storage (1 - 1½ months), 2¼ - 3"	fresh
Hazen	9/5	dark red	good to fair quality, 2¼ - 3"	fresh, pie, sauce
Wealthy	9/5	striped cherry red	uniform smooth shape, 2¼ - 3", attractive, mildly acid, very good quality, fair storage (1 - 3 months)	fresh, pie, sauce, baking
Red Baron	9/15	bright cherry red, very attractive	2½ - 3", clusters, crisp, juicy, mildly acid, good quality, good storage (2 - 4 months)	fresh, pie, sauce
Lakeland	9/15	dark solid red	2¼ - 2¾", mild flavor, holds up very well when processed, good storage (2 - 4 months)	baking, pie, fresh, sauce
Minjon	9/20	bright attractive red	2 - 2¾", slightly acid flavor, good storage (2 - 4 months)	fresh, sauce, baking, pie
Prairie Spy	9/30	striped red, fair color	mild flavor, holds well in processing, stores well, 2½ - 3"	fresh, pie, sauce, baking
Haralson	9/30	striped red, quite attractive	med-large 2½ - 3¼", crisp, juicy, tart, russets at times, very good all purpose apple, excellent storage (3 - 6 months)	fresh, pie, baking, sauce
Fireside	after 9/30	striped red, fair color	large (2½ - 3½"), sweet, good quality, stores well	fresh
Keepsake	after 9/30	full red, good color	med small (2 - 2½"), very firm and crisp, hardy tree, stores very well	fresh, pie, sauce
II. CRABAPPLES — HARDIER THAN LARGER FRUITED TYPES				
Rescue	8/5	full red	mildly acid, 1½ - 1¾", good quality, poor storage, extremely hardy, very productive	fresh, sauce
Centennial	8/20	half bright red, half yellow	oval shape, 1½ - 1¾", mildly acid, fair quality, susceptible to applescab	fresh, jelly, sauce
Whitney	8/25	full red	up to 2¼" across, yellow flesh, soft, mild flavor, juicy, very poor storage	pickles, fresh, sauce
Chestnut	9/1	striped red, mild russeting	up to 2¼" across, large, snappy, crisp, juicy, spicy sweet flavor, very good quality, keeps fairly well (1-2 months)	fresh, sauce

U of M Launches Tourism Center

Larry Simonson, Extension Specialist, Tourist Services
John Sem, Director, Tourism Center, St. Paul

Following several months of study, the formation of a University of Minnesota Tourism Center was announced during 1987. This is an extension of the travel-tourism work begun in 1961. The center will organizationally be at home within the Minnesota Extension Service but will be broadly based across the entire University for research, educational programs and communication to and for the tourism industry.

The new Tourism Center is funtioning with a limited staff, including John Sem, Director, St. Paul; Barbara Koth, assistant extension specialist, Tourism Development St. Paul; Glenn Kreag, Sea Grant tourism/recreation agent, Duluth; David Lime, recreation researcher, School of Forestry, St. Paul; and Larry Simonson, extention tourism specialist, Grand Rapids. Additional inputs to the Center include a consulting role from John Eix, area economic development specialist, Park Rapids; Bud Crewdson, extension economist, Business Development, St. Paul; and other specialists, area agents and county extension personnel as interests dictate and programs develop.

The major objective of the Tourism Center is to develop and deliver to the tourism industry over time, a comprehensive system of educational programs, needed research, and useful communication with the industry. The program will be coordinated to complement other efforts such as work done by the Minnesota Office of Tourism or the many effective trade associations and industry organizations. The program will help to fill those education and research voids not now being addressed and will work closely with the entire structure of tourism as resources permit.The Center could emerge as follows:

1. Locations on the Twin Cities and/or Duluth Campus of the University with outreach capability to the entire state through the extension network and coordinate campuses of the University.
2. A staff including:
   - A center director with travel-tourism credentials to further the Center development and administer the program.
   - Data management specialists to accumulate, manage and make available information useful to industry businesses, organizations, communities and travel related agencies.
   - Researchers capable of generating information to help develop and promote businesses, assist communities in building their travel industry and guide organizations and agencies in more effectively relating to tourism. This will not replace travel-tourism research now being done by the Office of Tourism and others but rather will augment and complement those efforts.
   - Educators, such as area tourism agents in key locations and specialists in fields such as marketing, business management, physical plant development, food service management and others, with a delivery system to the industry through the extension network.
   - Communication people capable of developing the necessary linkages and providing information to the industry through newsletters, publications, research reports, and media materials.

The scope of this program will evolve over time as the Center grows and matures and resources become available. This Center would be a modest investment indeed to provide a comprehensive and worthwhile research and educational arm for one of the most dynamic and growing industries in Minnesota. Travel-tourism contributes nearly five and one half billion dollars to the economy of the state of Minnesota and in many northern Minnesota counties it is the largest economic segment.

Editor's Note: This article is an excerpt from TOURIST TRAVEL NOTES, a tourism publication edited by Dr. Simonson. Direct inquiries to Dr. Simonson at the North Central Experiment Station.

Hay Marketing Tips

David L. Rabas

Most of the northeastern one third of Minnesota received adequate and in a few locations excessive rainfall during last fall's soil moisture recharge period. This rainfall followed by early and abundant snowfall has resulted in more than adequate soil moisture reserves in most of northeastern Minnesota. Unless a severe summer drought recurs in 1989, this area has the potential to produce excess quantities of hay.

Fall rainfall in northwestern, central and much of southern Minnesota was not adequate to replenish depleted soil moisture reserves. Winter snowfall occurred after the ground froze and is not adequate to restore favorable soil moisture levels. Hay supplies in this area are expected to be short. The most severe shortages are likely to occur across the central Minnesota dairy belt. Markets for quality hay are expected to be good in most of Minnesota in 1989.

Hay marketing in years of severe hay shortages is easy. Maintaining markets in times of adequate hay supply requires some planning. Farmer experience in hay marketing has been varied. If supply is short buyers are willing to take most kinds of hay. In years when supplies are abundant, lower quality hay is difficult to market.

Before producers get into the hay growing and marketing business they need to consider the following questions. What do buyers want? Where is the market? Can they annually supply adequate quantities of the type of forage their buyers want? Does their hay package fit the buyers storage and feeding system? How far and at what price can they move their hay? At what price can they obtain a reasonable return on their investment and production costs? Identifying the market and the market demand and producing and selling the type of hay that fits the buyers needs is the most important initial step in the hay marketing business.

The most successful hay markets are contract growing and repeat customers. These markets are developed and maintained largely on the reputation of the seller. It is important to take the time to build customer confidence in quality, supply and price. The seller needs to be able to consistently produce the quantity and quality that buyers require for their feeding programs. The seller needs to represent the hay quality fairly and accurately. Unloading a bunch of poor quality hay on an unsuspecting buyer is the fastest way to destroy a market. Sellers need to price hay fairly. Sellers can expect to receive higher prices in years of short supply. Excessive pricing in severe shortage situations can destroy a reliable annual market. Both seller and buyer need to consider longer term market opportunities.

Once the more subtle factors associated with developing and maintaining markets are understood, hay marketing becomes more a function of identifying markets based on quality requirements, desired package type and market location. Hay quality tests make hay marketing easier for buyer and seller. High quality hay is usually easier to market especially in years of more normal hay supplies. Dairy farmers are obviously the best market for high quality hay. Much of the hay sold in Minnesota is marketed on the basis of Relative Feed Value. RFV is a good way to compare the digestibility and intake potential of hay. Table 1 describes the quality of hays of various relative feed values. Dairy farmers would generally be interested in prime and grade 1 hay. Grade 2 and 3 hay would fit into the feeding program of most beef cow/calf producers and into mature dry dairy cow rations. Grades 4 and 5 may be difficult to feed except on a full feed basis to dry mature beef cows.

Table 2. Average price, crude protein, and relative feed value index of hay sold at quality tested hay auctions during 1987-88 and 1988-89.

	1987-88[1]				1988-89[2]			
Test Standard	Num lots	CP	RFV	Price	Num lots	CP	RFV	Price
		%	index	$/T		%	index	$/T
Prime	9	20.3	159	95	40	21.3	165	149
1	72	20.1	136	87	71	19.3	139	135
2	113	17.5	114	58	58	16.9	115	108
3	84	15.2	96	40	16	13.7	99	94
4	17	13.6	82	34	7	12.0	82	81
5	4	12.9	72	27	4	10.7	74	76

[1]Auction site and number: Browerville, 1; Caledonia, 3; Lanesboro, 2; Sauk Centre, 3; and Zumbrota, 4.

[2]Auction site and number: Browerville, 2; Caledonia, 3, Preston, 1; Sauk Centre, 4; and Zumbrota, 2.

Source: Neal P. Martin, **Minnesota Forage Update**, Winter 1989.

Table 2 demonstrates that farmers are willing to pay for forage quality. The prime and grade 1 hay market has consistently been 20 to 40 dollars per ton higher than grades 2 or less.

The type of hay package affects market potential and may impact on market location. Dairy farmers more often require the traditional "square" bale. Most are not equipped to store or feed large round bales. Fifty pound square bales are easier to handle on the farm but restrict load sizes and thus increase hauling costs. Beef producers may prefer 700 to 1200 pound round bales. Because fewer tons can be hauled per load, round bales are generally marketed over shorter distances than large square bales.

Hay transportation costs can be high. Higher priced high quality hay and more densely packed square bales can be more economically moved long distances. At two dollars per loaded mile, hauling charges can add 10 to 20 dollars per ton to the cost of hay for each 100 miles market distance.

Several sources are available to assist in locating hay markets. The ***U.S. Hay Marketing Newsletter*** is a good source for national markets. Farmers who receive the ***Hay and Forage Grower*** magazine have access to a monthly national hay market update. For local markets, the Minnesota Extension Service provides a statewide buyer and seller list through the Minnesota Hay Market Exchange. The Exchange emphasizes marketing quality tested hay.

Large round bales are generally marketed at shorter distances than small square bales.

Table 1. Forage quality standards for legumes, grasses and legume-grass mixtures.[1]

Quality standard[1]	RFV[2]	ADF[3]	NDF[3]	DDM,%[4]	DMI % of BW[5]
		% of DM	% of DM		
Prime	>151	<31	<40	>65	>3.0
1	151-125	31-35	40-46	62-65	3.0-2.6
2	124-103	36-40	47-53	58-61	2.5-2.3
3	102-87	41-42	54-60	56-57	2.2-2.0
4	86-75	43-45	61-65	53-55	1.9-1.8
5	<75	>45	>65	<53	<1.8

[1]Standard assigned by Hay Market Task Force of AFGC.

[2]Relative feed value (RFV) calculated from (DDM x DMI) ÷ 1.29. Reference RFV of 100 = 41% ADF and 53% NDF.

[3]ADF = acid detergent fiber, and NDF = neutral detergent fiber.

[4]Dry matter digestibility (DDM, %) = 88.9 - (.779 x ADF%).

[5]Dry matter intake (DMI, % of body weight) = 120 ÷ forage NDF (% of DM).

Source: N.P. Martin and J.G. Linn, Forage Quality Tests and Interpretation, UM Extension Folder AG-FO-2637.

Quarterly Report

Robert F. Nyvall, Superintendent

As of this writing spring has teasingly walked by the window but has yet to come in the door to stay. The temperature is in the 20s and there are still snowbanks.

Dr. Nils Hasselmo, President of the University of Minnesota, visited our station and the Grand Rapids area on April 5. His visit was cosponsored by the University of Minnesota Alumni Association, the Grand Rapids Swedish Club, the Northern Minnesota Citizens League and the North Central Experiment Station. Dr. Hasselmo spoke on the subject "A Report Card on the University" at the Northern Minnesota Citizens League Noon Forum. It was a privilege and an honor to have the President in Grand Rapids. He is working very hard to get the University's message out to the people in the state.

We interviewed two candidates for our marketing position. However, we have yet to fill this much needed position. This position will help to develop marketing strategies for fruit and vegetable growers in northern Minnesota. Failing to hire a full time position, we will be looking at graduate students.

I'm often asked "What do you do at the Station in the wintertime?" In some respects we are busier in the winter than the summer. Data is being written up into comprehensive results; meetings are being held and attended; plans made for next year; animals are still fed and cared for and animal experiments are still going on. One project is the repair and maintenance of our machinery and equipment (most of it very old). This winter John Sucher, farm equipment operator, has been cleaning up and repainting tractors and farm equipment. John's hobby is restoration of antique farm machinery so it is entirely appropriate that restoration of our equipment is a winter project. John's doing a beautiful job and our old machinery is looking new again!

Think spring!

FFA Contests

Over 150 Future Farmers of America from 10 schools participated in the District III contests on April 4 at the experiment station. High Schools participating from around the area were Aitkin, Blackduck, Cook, Northome, Cherry, Toivola-Meadowlands, Duluth, Grand Rapids, Hibbing and Barnum. Contests were held in Dairy; Dairy Showmanship; Agri-Mechanics; Nursery, Landscape and Gardening; Agri-Business; General Livestock; Forestry and Job Interview. Contests were conducted by employees of the North Central Experiment Station in cooperation with the vocational agriculture teachers from the various high schools. Winners in the contests will participate in the state-wide contests held in St. Paul at the University of Minnesota Campus later in April.

Winning teams were Dairy—Aitkin; Dairy Showmanship—Cherry; Agri-Mechanics—Aitkin; Nursery, Landscape and Gardening—Cherry; Agri-Business—Blackduck; Forestry—Duluth and Job Interview—Toivola-Meadowlands.

COMING EVENTS

Visitors Day	9 a.m. to 3 p.m. Thursday, July 20, 1989
Horticulture Night	4 to 7 p.m. Wednesday, August 30, 1989

Charles Patrick McManus 1914 - 1988

Charles McManus, a student at North Central from 1934 to 1938, died on October 8, 1988. Mac was an honor student and a member of the football and basketball teams. While a student he wrote the following article which was originally printed in the March 1935 **QUARTERLY**. Memorial cards may be addressed to his wife Alice at 59 Larson Lane, Duluth, MN 55803. Our sympathy is extended to his family.

The Country

The country is an answer to the prayer of a human being tired mentally and physically from the toils and heart-aches derived from fixed endeavors. One longs to walk dreamily through the welcoming shadows of the cool dark forest where the warm summer breezes are scented with the perfume of the wild roses. One thankfully inhales the balmy and life-giving breath of the pine, the moldy aroma of the graceful ferns. One desires to lie on the velvety grass by the rollicking and babbling brook and dream, while the loving birds twitter and sing to their mates in a nearby sheltering canopy. To wander up a hill, alive with countless mammals scampering to and fro as they hear approaching footsteps, is the wish of many a lonely dreamer. As one gazes at the wide expanse of a lowland, one can detect the fields of waving grain ripening in the noonday sun; the sweet everlasting fragrance of new mown clover is carried with the gently caressing wind, to the one alive and in love with the environment of Nature's supernatural beauties. The sun sets in the west; a dark and purple haze borders the towering, snowclad mountain; one no more wonders why the poet achieves an inspiration and writes so fluently. One watches the silvery moon climb lazily through the tree tops, and follows the fleeting and ghost-like shadows dancing merrily arm in arm with rippling waves on the pond. The enchanting quietness casts a spell of solitude on the wandering dreamer yet it is merely happiness to enter a trance and see the beauties of Nature's paintings. Stooped shoulders are thrown back, eyes are turned toward heaven, and a prayer of thanks is whispered magically to God, the Father of the most beautiful, healthful, and phenomenal home for the tired soul—the country.

By Chas. McManus '36.

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DR. ROBERT F. NYVALL
Superintendent

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