



BioOptions

Newsletter of the Center for Alternative Plant and Animal Products

Volume 3, Number 2 Spring 1992

Sponsored by the Agricultural Utilization Research Institute, the Minnesota Extension Service
and the University of Minnesota Agricultural Experiment Station

Value-Added Meat Products Proceedings

Proceedings from the "Value-Added Meat Products Symposium" that was held March 26, 1992 are now available.

Sponsors of the symposium included the Center for Alternative Plant and Animal Products, Minnesota Extension Service, Dept. of Animal Science, Minnesota Assn. of Meat Processors, Agricultural Utilization Research Institute, Minnesota Beef Council, and Minnesota Pork Producers.

Chapters include: Food Trends and the Changing Consumer: Demand for Value-Added Service, Marketing of Specialty Meat Products, Ingredient Systems for Specialty Markets, Special Labeling Requirements for Meat and Poultry Products, Technology for Restructured Meat Products, Low Fat Emulsion Products, New Technology for Meat Products, Buffalo Processing, Niche Marketing, and Deer Farming and Venison Processing.

Cost of the proceedings, including postage is \$10.00. To order, make check out to "University of Minnesota" and send to June Rhoads, Extension Special Programs, 405 Coffey Hall, University of Minnesota, St. Paul, MN 55108-1030.

Brambles

Few crops are as well suited for small-scale agriculture as the brambles--raspberries and blackberries. Significant production can be achieved on just a few acres and berries are in great demand, not only for fresh eating but for desserts, jams and jellies, and wine. Raspberries and blackberries are very high in fiber, vitamin C, phosphorous, potassium, and magnesium and have more calcium than any other temperate fruit. Exquisite flavor, high nutritive value, and an exotic image push brambleberry prices to \$1 per half pint in rural areas and \$5 in urban centers. With yields of about 5,000 lbs. per acre, a gross return of more than \$13,000 per acre can be realized even with the lower price.

A wide variety of brambles includes summer-bearing red raspberries (fruiting occurs on second year canes), first to market--usually in late June or early July. Next are black and then purple raspberries. Blackberries (including Loganberries and Boysenberries) and blackberry-raspberry hybrids (e.g. Tayberries) ripen from July through August. Finally, from late August through frost, red raspberries are again available from varieties that produce on the tops of first year canes. A few raspberry cultivars have yellow fruit. In all but the most severe climates, a grower can select bramble types that continuously supply the market from late June through frost.

The challenges are many. Brambles need much labor. Canes must be annually pruned and trellised; this cannot be done well mechanically. Fresh market fruit must be hand-harvested and sold soon after picking. Raspberries and blackberries have the shortest shelf life of any temperate fruit; only special care can maintain quality. Few commercial growers have more than 5 acres in production; and even this required excellent management.

Potential growers should assess natural, capital, and human resources and likely markets before considering brambles. Climate largely determines which types can be grown. Cold winters limit northern ranges; lack of adequate chilling during dormancy limits southern ranges. In general, blackberries are more adapted to southern and raspberries to northern climates. The coastal Pacific Northwest offers an ideal climate--with winters and summers that are usually mild. Brambles can be severely injured when temperatures drop rapidly between late fall and early spring.

In most areas, special sites and cultivars are required. But the many cultivars will allow growers to product at least one variety of bramble fruit. Local county cooperative extension agents can recommend varieties for a particular area.

(See *Brambles* page 2)



(Brambles from page 1)

Important for brambles is a well-drained soil. Many varieties are extremely susceptible to diseases in cool, wet soils. Many varieties are extremely susceptible to diseases in cool, wet soils. Artificial drainage is usually a sound investment. The site should allow cold air to drain; in northern areas, northeast slopes minimize temperature fluctuations until spring.

Prior cropping history is important; weeds and vegetables crops can harbor verticillium wilt disease to which many brambles are susceptible. Growers should identify land for rotation before replanting old fields.

Regarding capital needs, it usually takes more than \$6,000 an acre to establish brambles. Total investment may be recovered within 6 years, according to Mark Castaldi's "The Cost of Establishing and Producing Small Fruits for Pick-Your-Own and Commercial Harvest (\$3), Department of Fruit and Vegetable Science, Cornell University, Ithaca, NY 14853.

Labor needs, very inconstant, are a major factor. In full production, each acre may need 19 pickers. State and Federal labor laws must be adhered to. See "Agricultural Employers Notebook," (\$14) from Cornell Cooperative Extension, P.O. Box 217, Alton, NY 14413.

Fruit growers should explore potential markets before investing. Prices can vary considerably with supply, location, demographics, and time of year. Eastern prices are generally higher than those in the West; the large Washington-Oregon processing industry can depress prices. In the South, many consumers won't pay prices listed for exotic produce.

Dale Stokes, former president of

the North American Bramble Growers Association, says market identification is the most important component of success. Pick-your-own (PYO) is popular for marketing because it reduces harvest labor costs. Successful PYO operators link entertainment with harvest; many customers view picking as recreation. Supermarkets often buy fruit from a grower to bypass a warehouse. Such growers must pay much attention to quality and consistency, packing and cooling fruit soon after picking to extend shelf life. Some restaurants pay top dollar for fresh raspberries and blackberries but each restaurant uses only a relatively small quantity and deliveries cost time and gasoline. Roadside stands can be popular but a diverse selection of items may be needed to justify a stand. Many growers sell to others' stands.

Besides fresh fruit, a small-scale grower can produce value-added jelly, juice, wine, syrup, or candy. In St. Louis, Bissinger's a small candy store, chocolate-coats raspberries in summer, hardly keeping up with demand at \$32 a pound. Sand Hill Berry Farm in Pennsylvania markets a gourmet raspberry vinegar--raspberries, apple cider vinegar, and sugar. The Tomasello Winery in New Jersey finds its raspberry wine popular. "Liquor Store" magazine reports raspberry will be the next flavor rage. Raspberry-flavored products are leading sellers at many outlets. Whistling Wing Farms in Maine sells raspberry products, such as jelly and syrup, all over the world by mail order. Its bakery does well selling raspberry pies, muffins, and turnovers. Opportunities are limited only by imagination.

With adequate resources and an identified market, a grower needs a year to prepare a planting site. Certain changes are difficult if not impossible to make once a planting

is established. First comes an adequate drainage and irrigation system. USDA's Soil Conservation Service (SCS) may help. Second, perennial weeds should be eliminated through repeated cultivation (as with an organic-enhancing cover crop), herbicides, or soil sterilization. Third, potential nematode populations should (See *Brambles page 3*)

BioOptions

is the quarterly newsletter of the Center for Alternative Plant and Animal Products at the University of Minnesota. The Center was created to aid in the development of new and alternative crop and livestock enterprises.

Steering Committee:

Charles Blinn
William Breene
David Davis
Jay Meiske
Richard Levins
Richard Meronuck
Vance Morey
Ervin Oelke
Douglas Pratt
Daniel Putnam
Michael Schmitt

Editor and Program Coordinator:

Laura McCann

Subscription rates: U.S. and Canada \$5 per year, other countries, \$8 per year. Send subscription inquiries and correspondence to: Center for Alternative Plant and Animal Products, 305 Alderman Hall, 1970 Folwell Avenue, Univ. of Minn, St. Paul, MN 55108; (612) 625-5747.



(*Brambles from page 2*) be assessed and controlled. Nematodes not only can damage plants directly but carry viruses that can decimate plantings. They are more of a problem in warmer climates and in lighter soils. Fourth, adjust the soil chemistry for adequate nutrients and a 6.5 pH--best for brambles. Soil testing varies among laboratories; each has its recommendations for phosphorus, potassium, magnesium, and calcium. Tests may point to peculiar soil conditions. Lime or sulfur can adjust the pH value; a year or more may be required for amendments to effectively change soil chemistry.

In the early 1900's, viruses destroyed a thriving U.S. bramble industry in the East. Uninfected plant materials were unavailable for propagation. But in the 1970's, nurseries, applying tissue-culture techniques, produced brambles without harmful viruses or exposure to diseases. Never propagate brambles from a neighbor's patch; infection with viruses from nearby wild brambles is likely. A high demand exists for yellow (golden) raspberries, but plants seem more susceptible to diseases than traditional red raspberries.

The most complete reference for cultural practices is "Bramble Production Guide," \$35, NRAE5-35, Riley-Robb Hall, Cornell University, Ithaca, NY 14853. It notes how each type must be treated differently. Federal and state researchers recently learned that:

-Plants propagated from tissue-culture, although vigorous and virus-indexed, are sensitive to herbicides normally applied at planting. A straw mulch during the planting year or planting through black plastic may be better than conventional herbicide weed control.

-Spreading fruiting canes apart in the row in a V-configuration significantly improves fruit yield and hastens drying within the plant canopy and makes spraying and harvesting easier.

-New trellising systems for mechanical harvesting include use of monofilament nylon wire as strong as metal but not conductive of lightning.

-Although raspberries are not widely grown in the South, displaced northerners will demand fresh fruit. Some recently developed southern blackberries include several erect types--no trellises needed--such as Arkansas' recently released thornless Navaho.

-A combination of first year cane suppression, plus mowing half the planting every other year, can bring yields equal to conventional annual intensive pruning and fruiting. This also reduces labor and spray costs--half the cost of planting fruits in any one year.

-Using a floating row cover in early spring over fall-bearing raspberries, such as Heritage, accelerates cane growth and yields. Covers in the north can minimize damage from frosts.

-Inoculating brambles at planting with new strains of particular soil fungi and bacteria may prevent subsequent harmful infection.

-A combination of rapid cooling after harvest, storage of fruit near 30 °F, and maintaining high humidity and carbon dioxide in the storage room prolongs shelf life.

Among pests, of most concern are viruses that can be transmitted by aphids, leafhoppers, nematodes, or even bees carrying pollen from wild brambles. See "Virus Diseases of Small Fruits" (\$20), Ag Handbook

#631, U.S. Government Printing Office, Washington, DC 20402. Water or high humidity is essential for infection by most disease organisms, so proper pruning and trellising for good air drainage cuts disease pressure. Since most root diseases require standing water to complete their life cycle, good soil drainage minimizes these problems. Several insects attack bramble canes, flowers, fruit, and leaves. Responsible growers scout plantings regularly, applying insecticides only when pests reach damaging levels. Avoiding locations near insect habitats helps. The American Phytopathological Society has a "Compendium of Raspberry and Blackberry Diseases and Insects," describing with colored photographs many bramble problems--such as herbicide injury and nutritional deficiencies. (\$25, APS, 3340 Pilot Knob Road, St. Paul, MN 55121)

The North American Bramble Growers Association provides helpful information. Membership is \$45 plus \$5 per acre up to a maximum of 7 acres. (Richard Fagan, Executive Secretary, Rt. 2 Box 539, Cumberland, MD 21502)

Excerpted from "Brambles" prepared by Marvin P. Pritts of the Department of Fruit and Vegetable Science, Cornell University, and George B. Holcomb of the Office of Public Affairs, U.S. Department of Agriculture (USDA), for USDA's Office for Small-Scale Agriculture (Howard W. "Bud" Kerr, Program Director). O SSA's address: Cooperative State Research Service, USDA, Room 342-D, Aerospace Building, Washington, DC 20250-2200.



Publications

CAPAP Publications are available for sale as previously mentioned in "BioOptions". The **Alternative Field Crops Manual** is a joint publication of CAPAP and the Univ. of Wisconsin. The 3-ring binder with over 40 crops is available for \$45. **Alternative Crops for Minnesota** (\$10) includes a brief description of over 30 vegetable, fruit and field crops. **Alternative Agricultural Opportunities: A Bibliography**, with references to over 1500 publications, is available for \$5. Three research reports are available: **Lupin Manual** (\$10), **Production of Belgian Endive in Minnesota** (\$5), and **Prospects for Canola in Minnesota** (\$5). To order, send check made out to University of Minnesota to: Center for Alternative Plant and Animal Products, 340 Alderman Hall, Univ. of Minnesota, St. Paul, MN 55108. Proceedings from symposia conducted by CAPAP are also available. They include: **Commercial Field Production of Cut and Dried Flowers** (\$20.00), **Grain Legumes as Alternative Crops** (\$20.00), **Shiitake Mushrooms** (\$20.00), **Soybean Utilization Alternatives** (\$30.00), **Strategies for Alternative Crop Development (Case Histories)** (\$10.00), **Deer Farming** (\$11.00), **North American Dairy Sheep Symposium** (\$17.00), **Organic Meat Symposium** (\$17.00), **Wood Based Economic Development in the Lake States** (\$20.00), **Amaranth: Production, Processing and Marketing** (\$20.00), **Prospects for Lupins in North America** (\$20.00), and **Value Added Meat Products** (\$10.00). To order proceedings, make check out to University of Minnesota and send to Extension Special Programs, 405 Coffey Hall, 1420 Eckles Ave., University of Minnesota, St. Paul, MN 55108.

Goat Meat Production and Marketing Proceedings are available from a national symposium that was held last summer. It includes over 200 pages of information on goat meat breeding, production, processing, and marketing. It also includes information on marketing goat skins and cashmere fiber. Cost of the proceedings is \$25. Make check payable to "Langston University Foundation" and send to the Kika de la Garza Institute for Goat Research, P.O. Box 730, Langston Univ., Langston, OK 73050.

Small Farm Today is the new title of the "Missouri Farm Magazine". This publication provides information on alternative crops and livestock, organic produce, exotic livestock, homebased business, and marketing. Subscription cost is \$18 per year. For further information contact "Small Farm Today", Rt. 1, 3909 W. Ridge Trail Road, Clark, MO 65243.

Best of Missouri Hands Volume IV is a catalog that markets high quality Missouri crafts. It will include a section listing Missouri stores and galleries that sell Missouri crafts, wine, or specialty foods. It will be published in May 1992. For more information, contact Edie Pigg, MABDA, Drawer VR, T-16 Research Park, Columbia, MO 65211; (314) 882-9889.

ASCFG Membership Directory and Buyers Guide is the newest publication of the Assn. of Specialty Cut Flower Growers. The directory lists all members and provides a short description of many growers, buyers, and suppliers. The directory also cross references growers by crops and notes when the product is available. Cost is \$15 for members and \$20.00 for non-members. **Proceedings of the Third and**

Fourth National Conferences are also available. Member price is \$20, non-members \$25. To order these publications, contact: ASCFG, 155 Elm Street, Oberlin, OH 44074. Outside the U.S., please add \$3 for postage and handling.

Flowers for Sale: Growing and Marketing Cut Flowers - Backyard to Small Acreage; A Bootstrap Guide is written for small or beginning cut flower market gardeners. It offers a thorough introduction to the commercial cut flower business in the U.S., plus an easy, step-by-step plan for starting a flower growing and selling business. It is available for \$15.95 postpaid from San Juan Naturals, P.O. box 642S, Friday Harbor, WA 98250.

Everlastings Flowers for Pleasure & Profit is a 64 page publication that covers preparing the soil, starting the seeds, growing and picking the flowers, drying in silica gel, preserving in glycerine, pressing, storing and packing flowers, as well as the finished products and suggests ways to sell them. Over 40 flowers and herbs are described and illustrated and supply sources listed. This publication is available for \$11.00 from Jeanette Verhelst, P.O. Box 178, Radville, Saskatchewan, CANADA S0C 2G0.

Cropportunities Proceedings are available from a conference that was held at the Univ. of Saskatchewan last summer. The price is \$16.05 in Canadian currency. To order, make check or money order payable to Univ. of Saskatchewan and send to: U Learn Centre, Extension Division, Univ. of Saskatchewan, Saskatoon, Sask. S7N 0W0, CANADA.



News Briefs

Gardening blossoms as Baby Boomers discover it (The Wall Street Journal). Gardening is an environmentally correct, inexpensive, stay-at-home hobby. It can also increase the resale value of a home. The National Gardening Assn. reports that industry sales were up 27% in 1990 and an additional 6% in 1991. Vegetable garden sales went up 19% in 1991 while culinary herbs doubled. Sears, Roebuck & Co. reported record sales in lawn and garden products. These increases in sales come in the midst of a recession. According to Jim DeLash of Burpee Seed Co., "A bad economy generally helps us. You're likely to cut back on buying a VCR or a new car, but you won't eliminate gardening."

Slower growth for catfish industry is in store according to the October, 1991 "Agricultural Outlook". Processor sales rose more slowly than production capacity in the late 1980's, causing inventories of market-sized fish to rise. Sales of processed catfish rose from \$36 million in 1979 to \$410 million in 1990.

Beef tallow protects big bales of hay (Missouri Farm News Service, December 18, 1991). Extension livestock specialist Dale Watson was looking for a way to retain the nutritive value of large round bales of hay without having to wrap the bales in plastic or move them into a barn. He melted tallow and applied it to the bales with a garden sprinkler. When he cut open the bales, they were bright green with no rain damage.

U.S. spice demand increases; Domestic production on the rise was the title of a recent article in the "Herb Market Report" (vol. 7:10). According to the American

Spice Trade Assn., U.S. spice consumption set another record in 1990, reaching 795 million pounds, a 50 million pound increase from 1989. The U.S. now supplies one third of its total consumption. The biggest gainers were the hot spices. Total capsicum consumption has increased 143% in the last 10 years. Other gainers include black and white pepper, dehydrated onion and garlic, oregano, basil, allspice, sesame seed, cumin, bay leaves, and thyme. Higher demand for ethnic foods and the trend towards less salt have contributed to the increase in spice demand.

Barriers to growing alternative crops in Iowa were discussed in the "Leopold Letter" (vol. 3:4). A wider base of economic crops would greatly help to ensure the sustainability of agriculture in Iowa. Additional row or forage crops would break weed, insect, and disease pest cycles; add stability to the landscape; and help diversify farmers' risks to offset unforeseen weather and market forces. Reasons for alternative crops not catching on include: a farm policy that has emphasized feed grains, farm input and processing industries' vested interests in current crops and production methods, and the lack of suitable varieties, cultural controls, and equipment for alternative crops.

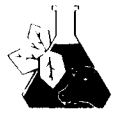
Flamer toasts Colorado potato beetles according to the July 1991 issue of "The Grower". A propane gas flamer developed by Cornell Extension staff provides 70 to 90% control of over-wintering adult beetles compared with the 25 to 50% control obtained with chemical insecticides. It also costs about \$5 per acre to use compared to \$18 to \$25 per acre for chemical control. A Long Island potato grower experimented with a flaming device

but it was slow and provided inconsistent control. An Extension specialist helped him improve the design. The optimum time to use the flamer is before the plants reach a height of 6-8 inches. It should be used when the beetles are actively feeding. The flamer also reduced egg hatch by 35%. Flaming the plants does not seem to adversely affect yields.

Aspen fibers are new packaging alternative (Rural Enterprise, Spring 1991). American Excelsior Company is now producing Aspentones, environmentally-sound packaging made from natural aspen tree fibers. It is available in 14 colors and can be used as packaging for gifts, arts and crafts projects, floral arrangements, displays, and industrial and food packaging.

Ginseng secrets are kept under wraps according to an article in the September 1991 issue of "Country Guide". Ginseng growers are a close-mouthed bunch. They knew they were on to a good thing and didn't want to share. Printed information on ginseng production is also difficult to obtain. Recently the Ginseng Growers Assn. of Canada was formed. Membership is \$200 and only members are able to attend the annual meeting where the latest production techniques are shared. French growers recently approached the group about an information exchange. The GGAC put a price tag of \$3 million on their know-how. Needless to say, no deal was struck.

Yields like corn, feeds like alfalfa. An article in the February 1992 issue of "New Farm" highlights a perennial silage crop called cup-plant (*Silphium perfoliatum*). It has been reintroduced into the U.S. from (See *News Briefs* page 6)



(*News Briefs from page 5*) the former Soviet Union. Ironically, it is native to the Upper Midwest. It is adapted to marshy areas and also has an extensive root system that makes it drought tolerant. Maximum yields of 10 tons of dry matter per acre are obtained when stands are about 7 years old, without fertilizer. Stands can be left for up to 15 years. In trials at the Michael Fields Agricultural Institute in Wisconsin, crude protein levels ranged from 16-18% for the first cutting and the mid 20's for the second cutting.

Newspaper disposal method could yield valuable mushrooms (Rural Enterprise, vol. 6:2). University of Minnesota forest products specialist Elmer L. Schmidt has experimented with growing oyster mushrooms on bales of shredded paper. This system would produce a valuable product and help eliminate the paper surplus as well. The bales could be used as garden compost after the nutrients have been used by the mushrooms. Oyster mushrooms currently sell for about \$12 per pound in stores. The mushrooms produced in this way did not have any higher concentration of metals than store-bought mushrooms.

Staley announces new fat replacer (INFORM, vol. 2:8). The A.E. Staley Manufacturing Co. has developed a new fat substitute that the firm says can replace up to 60-80% of the fat in many food products. The new product, Stellar, is a fine powder derived from cornstarch that forms a "creme" when mixed with water. The creme contains 25% Stellar and 75% water and can be substituted for fat on a 1:1 basis. It contains 1 calorie per gram while fat contains 9 calories per gram. The company has been able to avoid the regulatory approval process because Stellar meets the existing

regulations for modified food starch. An advantage of the product is that it is more heat stable than other fat replacers and so could be used in cakes and other baked goods as well as margarine, cheese, sauces, and frozen desserts.

Outlook for U.S. castor production is positive according to J. Browning, president of Browning Seed Co. and of Castor Oil Inc. (INFORM, vol. 2:8). Castor was grown in the Texas High Plains in the 1960's, and in 1970 the U.S. produced 65 million pounds of castor oil on 80,000 acres. Changes in the farm program and a dispute between processors and producers decimated castor production. Recently there has been renewed interest in this industrial oil. Ricinoleic/sebacic acid, castor oil derivatives, are listed as strategic materials by the U.S. Dept. of Defence. Many obstacles need to be overcome before castor is seen as a viable crop including: adequate prices, seed supply, harvest equipment, reactivation of crushing plants, and development of allergen-free castor meal. Texas A&M Univ. has developed a system to remove 99% of the allergens from castor meal which results in a high quality livestock feed. Other constraints are also being addressed.

Forest Resource Center multi-species shiitake cultivation field trials were discussed in the March 1992 issue of "Shiitake News". Ten locally abundant and underutilized tree species were inoculated with five commercial strains of shiitake mushroom spawn. Red oak, white oak, sugar maple, and paper birch performed very well across strains in regards to fruiting success rates and conversion rates. Paper birch produced the largest and most symmetrical mushrooms. Ironwood, a widespread species that has few commercial uses, also performed adequately. All species were handled the same so production on

some species might be improved with species-specific production techniques.

1991 specialty mushroom statistics from the National Agricultural Statistics Service indicate that volume of sales for commercially grown specialty mushrooms such as shiitake and oyster totalled 6.07 million pounds which was up 2% from 1990. The value of the specialty mushroom crop was \$22.4 million, about the same as 1990. Oyster production decreased by 6%, shiitake production grew by 4%, and other specialties increased by 15%.

Company cultivates new markets for customers (Farm Industry News, March 1992). Pioneer Hi-Bred Int'l started a Specialty Plant Products (SPP) division three years ago. SPP contracts for two type of specialty grains, crops with distinctive genetic qualities (food grain and specialty corns, modified fatty-acid soybeans) and crops grown under special conditions (without pesticides). The grains are identity preserved and sold at a premium for specialty markets. The pesticide free grains are marketed with a "Better-Life" label. Premiums to the farmer range from \$.10 to \$2.00/bu., depending on the crop, yield expectations, risk, and special handling requirements.

North American Plant Preservation Council, a non-profit organization modeled after the National Council for the Conservation of Plants and Gardens in England, has been formed. The goal is to encourage the collection, conservation and cultivation of uncommon and endangered plants. For more information and an application form, write to: North American Plant Preservation Council, Rt. 5, Renick, WV 24966.



Calendar of Events

May 7, 1992 - Forest Landowners Field Day Poteau, Oklahoma. For further information, contact Heidi Carter, Kerr Center for Sustainable Agriculture, P.O. Box 588, Poteau, OK 74953; (918) 647-9123.

May 17-20, 1992 - Fourth North American Symposium on Society and Resource Management Madison, Wisconsin. The symposium will focus on the integration of social and biological sciences as they together address natural resource and environmental issues. Eighty paper sessions, or over 250 papers, have been scheduled. For further information contact Mary Miron, School of Natural Resources, 1450 Linden Drive, Room 146, Madison, WI 53706; (608) 262-6968.

June 1-3, 1992 - Energy in Rural America: Profits and Opportunities in Agriculture, Fuels and Utility Issues Des Moines, Iowa. Contact Gail Ettinger, 309 Davis Street, Evanston, IL 60201; (708) 864-5651.

June 4-7, 1992 - Diversity in Food, Agriculture, Environment and Health East Lansing, Michigan. For further information contact Prof. Lawrence Busch, Dept. of Sociology, Michigan State Univ., East Lansing, MI 48824-1111.

June 9-11, 1992 - 3rd Specialty Mushroom Workshop University Park, Pennsylvania. For further info, contact Agricultural Short Courses and Conferences, The Pennsylvania State University, 306 Agricultural Administration Bldg., University Park, PA 16802; (814) 865-8301.

June 22-August 14, 1992 - Introduction to Sustainable Agricultural Systems Davis, California. For more information on this summer course, contact Mark Van Horn, Student Experimental Farm, Dept. of Agronomy, University of California, Davis, CA 95616; (916) 752-7645.

June 24-26, 1992 - Corn Utilization Conference IV St. Louis, Missouri. Sponsored by the National Corn Growers Assn. and CIBA-GEIGY Seed Division. For more information contact Ann Beirne, National Corn Growers Assn., Suite 105, 1000 Executive Parkway, St. Louis, MO 63141-9938; (314) 275-9915.

July 11-15, 1992 - Int'l Floriculture Industry Short Course Cincinnati, OH. For more info contact the Ohio Florists Assn., 2130 Stella Court, Suite 200, Columbus, OH 43215-1033; (614) 487-1117.

July 9-12, 1992 - Herbs '92 Fort Worth, Texas. Sponsored by the Int'l Herb Growers & Marketers Assn. and co-sponsored by Texas A&M Univ., Purdue Univ., and the Texas Herb Growers and Marketers Assn. Martha Stewart, the well-known lifestyle author, will be the keynote speaker. For further information, contact IHGMA, 1202 Allanson Road, Mundelein, IL 60060; (708) 949-HERB. (See *Calendar* page 8)

Order Form - BioOptions

Please send me a subscription to BioOptions for 1992. I am enclosing a check or money order for \$5.00 (\$8.00 outside the U.S., Canada, and Mexico) made out to: University of Minnesota.

Send form and check to: Center for Alternative Plant and Animal Products
340 Alderman Hall
1970 Folwell Avenue
University of Minnesota
St. Paul, MN 55108

Send my subscription to: Name _____
Company _____
Address _____
City _____ State _____ Zip _____
Specific interest _____

Your comments about "BioOptions" would be most helpful to us. Please tell us what you like about our newsletter and how we could improve it. We also encourage you to send us information on upcoming events and new publications. *



(Calendar from page 7)

July 14-22, 1992 - International Crop Science Congress Ames, Iowa. Program topics include: Striving for a Productive and Sustainable Agriculture, Environmental Change: Challenges for Agronomists, Biodiversity, Crop Improvement Beyond the 1990's, and Advances in Physiology and Molecular Biology of Crop Plants. For further information, contact Dr. Kenneth J. Frey, Dept. of Agronomy, Iowa State University, Ames, IA 50011-1010; (505) 294-7607, Fax (515) 294-3163.

July 20-24, 1992 - First World Congress on Medicinal and Aromatic Plants for Human Welfare Maastricht, The Netherlands. Contact Dr. Choldwig Franz, Vorstand des Instituts für Botanik und Lebensmittelkunde der Veterinärmedizinischen Universität Wien, 1030 Vienna, Austria.

July 30 - August 1, 1992 - Participatory On-farm Research and Education for Agricultural

Sustainability Champaign, Illinois. For further information, contact: Dr. John M. Gerber, UI Agricultural Experiment Station, 211 Mumford Hall, 1301 W. Gregory Dr., Urbana, IL 61801.

August 13-15, 1992 - National Symposium on Dairy Goat Production and Marketing Oklahoma City, Oklahoma. For further information, contact Thian Hor Teh, Kika de la Garza Institute for Goat Research, P.O. Box 730, Langston Univ., Langston, OK 73050.

August 24-26, 1992 - Ornamental Crop Production: A Floriculture Short Course Davis, California. For more info call (916) 757-8777.

September 8-10, 1992 - International Sunflower Conference Pisa, Italy. For more information or to submit a paper, contact Conference Secretariat, c/o Istituto di Agronomia, Via S. Michele, 2, 56100-Pisa ITALY; Phone 050-571565, Fax 050-540633.

September 9-11, 1992 - Field Days at the Thompson Farm Boone, Iowa. For more info contact Barbara Bruno, Rodale Institute, 222 Main St., Emmaus, PA 18098; (215) 683-6383.

September 19-23, 1992 - Cucurbit Conference Raleigh, North Carolina. Research papers are being solicited with titles due July 24th. For more information contact Todd Wehner, Dept. of Horticultural Science, North Carolina State Univ., Raleigh, NC 27695-7609.

December 13-14, 1992 - Alternative Energy Conference: Liquid Fuels from Renewable Resources Nashville, Tennessee. Sponsored by the American Society of Agricultural Engineers. For symposium information contact: John Cundiff, VPI & SU, Agricultural Engineering Dept., Blacksburg, VA 24061.

Center for Alternative Plant and Animal Products
305 Alderman Hall
1970 Folwell Avenue
University of Minnesota
St. Paul, MN 55108

~~James L. ...
Walter ... Dept. of Ag. Econ
222 Classroom Office Bldg.
St. Paul Campus~~