UNIVERSITY OF KENTUCKY
COLLEGE OF AGRICULTURE
Lexington, Kentucky 40546

COOPERATIVE EXTENSION SERVICE

Kentucky Fruit Facts

Research & Education Center
P.O. Box 469, Princeton, KY 42445

January 1998 (1-98)
Prepared by John Strang, Jerry Brown, Extension Horticulturists; Dwight Wolfe, Horticulture Research Specialist; John Hartman, Extension Plant Pathologist; and Larry Jones and Tim Woods, Extension Agricultural Economists; John Strang, Editor, Marilyn Hooks and Elizabeth Griffin, Secretaries

Meetings

Jan 27-28 -- Indiana Horticultural Congress, Adam's Mark Hotel, Indianapolis, IN. Contact Jim Simon 765/494-1328.

Feb. 2-4 -- Northeast Ag. Direct Marketing Conf. & Trade Show, Sturbridge, MA. Contact 413/527-6572.

Feb. 4-6 -- Ohio Growers Congress, SeaGate Centre, Toledo, OH. Contact Mike Pullins 614/249-2424.

Feb. 17 – Botanical Herbs & Specialty Vegetables, Day tour of local horticultural businesses, Louisville, KY, 10:00-4:00p.m. and **The Future of Growing Botanicals for the Medicinal Plant Industry** 6:30-9:30p.m.,Registration $5.00. Contact Roy Ballard 812/948-5470.

Feb. 24 - March 1 -- North American Farmers' Direct Marketing Association Conference, Victoria, B.C. Contact 1-888-884-9270.

Feb. 26-28 – North American Farmer's Direct Marketing Conference and North American Strawberry Growers Annual Meeting, Victoria Conference Centre Empress Hotel, Victoria, British Columbia, Canada. Contact 250/656-0941.

Feb. 27 – Northern Piedmont N.C. Specialty Crops School. Ramada Inn, Exit #204 off of I-85, Oxford, NC, approximately 30 miles north of Durham. Registration $25.00. Contact Granville County Center 919/603-1350.

Mar. 9 - Opportunities in Mushroom Production, New Albany, IN. Registration $5.00. Contact Roy Ballard 812/948-5470.

Mar. 9 - 10 Management First for Apple IPM. Rough River Dam State Resort park. See article and registration form below. Contact jerry Brown 502/365-7541 Ext. 204 or john Strang 606/257-5685.

Jun. 14 – Kentucky Herb Festival, Lakeview Park, Frankfort, KY. Contact Sue Clifford 606/234-1452.

July 16-19 – International Herb Association Annual Conference, "Herb Smart Day" open to the public, July 19. Contact International Herb Association 847/949-4372, www.herb-pros.com.

Apple IPM Meetings

The Apple IPM planning committee has solicited and received feedback from producers and others about our educational endeavors. Based on this information, the apple IPM program is being expanded in two ways. One way is to cover a wider base of information about fruit production, including management, sales, and cultural information. Also, other horticultural crops will be included at certain UK Apple IPM meetings. The KSHS annual meeting was the first IPM meeting for 1998. Other events scheduled at this time include:

March 9 & 10 — Management First for Apple IPM 9:15 AM March 9 to 4 PM March 10 (Registration starts at 9 AM Central time)

The Management First for Apple IPM meeting will be held at Rough River Dam State Resort Park. The lead instructor is Dr. Steve Isaacs, UK Farm Management Specialist. Steve has indicated that a group of 20 to 25 is optimum to obtain good discussion sessions. This training, while emphasizing apple IPM is appropriate for all fruit growers. Management First seeks to enable families to achieve family and business goals through implementing proven principles of management. This meeting will cover the five functions of management: planning, organizing, staffing, directing and controlling in much more detail than the brief overview that was given at our Annual Fruit and Vegetable Growers meeting in January.

NOTE: Registration is limited to the first 25 to register. The registration fee is $25 per person and includes training material. You are responsible for your own meals and lodging. The reservation number for Rough River lodge is 1/800-325-1713. When making reservations at the lodge, please tell them that you are making reservations for the **MANAGEMENT FIRST FOR FRUIT GROWERS MEETING** to help us defray the meeting room cost. **The block of rooms for this meeting will be held until February 9, 1998. Please complete and mail in the registration form at the bottom of the last page.**

On farm meetings

May 20, 1998 — IPM meeting, Schlei's Orchard, Hopkinsville, KY

July 16 — The University of Kentucky All commodity field day.

July 20-30 — Best time to take foliar analysis of apples.

The 1998 apple IPM program plans technical assistance for interested producers. Details will be presented at the May 20 IPM meeting.

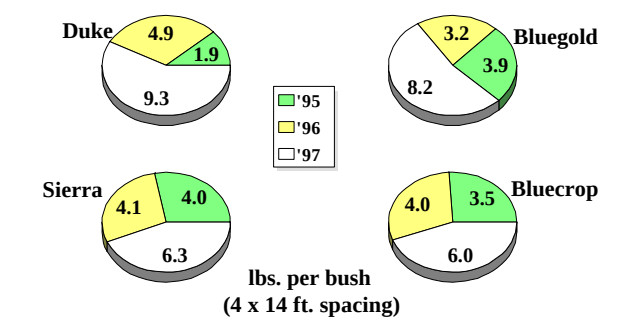
September 24, 1998 — IPM meeting, DePoyster's Orchard, Big Clifty, KY.

Food Price Outlook for 1998

Retail food prices as measured by the Consumer Price Index (CPI) have been forecast by the U.S. Department of Agriculture to increase between 2.5-3.0% in 1998. Food prices in 1997 likely increased 2.8% compared to a 3.7% rise in 1996. The cost of food away from home is expected to increase at a slightly, higher rate than the cost of food eaten at home. Food eaten away-from-home now comprises about 48% of total food dollars spent in 1997, up from about 39% as recently as 1990.

Food prices the past twenty years have been one of the most volatile components of the overall CPI. But since 1992 food price gains have more closely mirrored overall price gains in the economy by increasing at about a 3% annual rate. Several reasons account for this "relative" stability in food prices: (1) inflation has remained near 3% most years, (2) the farm value of the U.S. food dollar has been declining and currently averages about 22 cents meaning that food prices are increasingly influenced by marketing costs and less by farm commodity prices, (3) increasing economies of size in food production, particularly in livestock and poultry, have acted to slow the growth in per unit production costs, (4) continued growth in the portion of the food dollar spent on food away-from-home has acted to bring food prices under more influence of general economic factors rather than raw commodity prices, and (5) strong competition among restaurants has acted to hold down costs, particularly labor costs given recent increases in the Federal minimum wage. Fruits and

Fig. 3. Annual yield (lbs) per bush, 1995-1997. Bushes were planted in 1993 at UKREC, Princeton, KY.



UK 1997

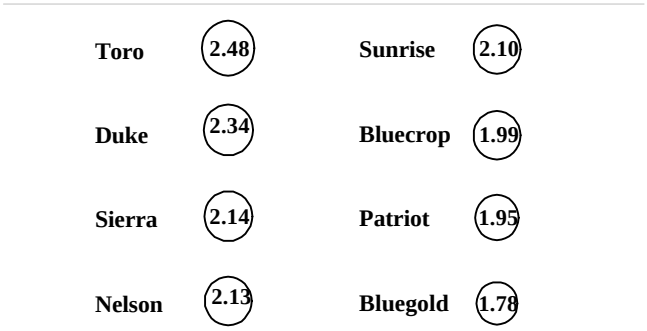
vegetables (both fresh and processed) account more than 19% of the at-home food dollar are expected to increase. These prices were relatively flat during 1997 due to abundant supplies. The forecast for 1998 is for a 3-5% increase with fresh fruits and vegetables likely increasing at a higher rate than processed products. (based on USDA Outlook-October, 1998, Larry Jones)

Blueberry Cultivar Trial Results

A highbush blueberry cultivar trial was established at the UK College of Agriculture Research and Education Center, Princeton, KY in 1993. Eight cultivars, Bluecrop, Bluegold, Duke, Nelson, Patriot, Sierra, Sunrise, and Toro were planted on a 4' X 14'spacing. The planting is maintained with a hardwood mulch in the row, fescue sod middles, trickle irrigation as needed and plastic netting of the bushes for bird control. The planting has been harvested for three years and berry size and yield are reported in figures 1-5. Cultivars ranked from easiest to hardest to pick are: Toro, Duke, Sierra, Sunrise, Bluecrop, Bluegold, Nelson, and Patriot. The planting was established and maintained by June Johnston, Dwight Wolfe, and Jerry Brown. Factors to consider in selecting a blueberry cultivar include fruit size, total yield, precocity, time of harvest, and number of harvests needed per year. The ultimate use of the blueberries may influence the desired fruit size (Fig.1), which can vary from the size of a pea to the size of a cherry. Many prefer smaller berries for cooking, but most consumers prefer large fruit for fresh use. High yield (Fig. 2) is highly desirable , but the time of harvest, which may coincide with other crops and avoiding labor peaks is important to many growers (Fig 5).The number of harvests needed to harvest most of the crop is also found in Fig 5. Some growers prefer a long season of steady yield, while others desire to harvest most of the fruit with fewer harvests. Precocity data, (Figs 3 & 4) helps determine how soon a particular cultivar will have a significant return. This article describes the early harvest years and the data will be updated as the planting matures. (Brown and Wolfe)

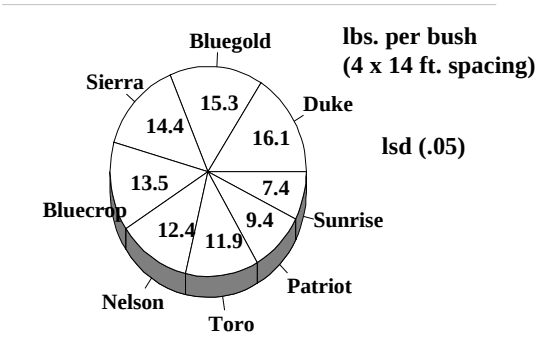
(INSERT FIGURE 4 HERE)

Fig. 1. Average berry size (grams/berry) for years 1995-199
Bushes were planted in 1993 at UKREC, Princeton, KY.



UK 1997

Fig. 2. Cumulative yield (lbs) per bush, 1995-1997.
Bushes were planted in 1993 at UKREC, Princeton, K



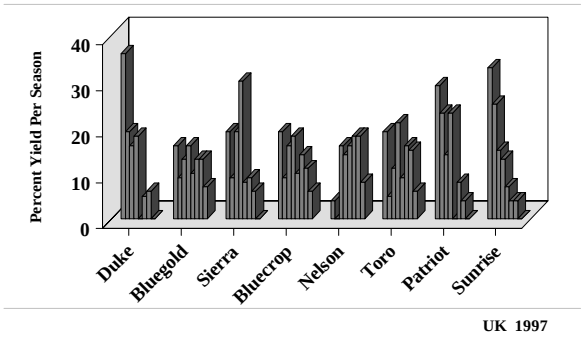
UK 1997

Produce Market and Production Reports Under Consideration

The Kentucky Department of Agriculture, in cooperation with the University of Kentucky, the state NASS office, and the Ag Marketing Service, is currently exploring options to expand the scope of market and production reports on selected horticultural crops grown in Kentucky. A recent survey was completed of state NASS horticultural commodity reports from around the southern and central U.S. A number of state reporting programs were identified that could serve as models for an expanded program in Kentucky.

Recent expansionary developments within the horticulture sector have prompted the KDA to

Fig. 5. Average Yield (1995-1997) by Picking, June 12 - July 12.



explore its possible expanded role in facilitating more reporting. Most of the acreage production information to date for annual vegetables has been very sketchy in Kentucky. The most reliable information has been from the Census of Agriculture conducted every five years. While the Census is valuable, and is being conducted this year, it is limited in its ability to monitor shorter term changes and trends. Furthermore, it does not attempt to provide a commodity by commodity estimate of the value of production.

The Ag Marketing Service has been paring back its price reporting service from various terminal markets. While access to daily terminal market price reports and regional arrival and shipment data has increased through the internet and other electronic transmissions, the AMS closed down the office reporting out of Cincinnati in 1996. This has left a void in the transmission of wholesale prices that has been an unfortunate loss for those marketing horticultural crops in and around Kentucky. The next closest terminal markets still generating reports are Atlanta, St. Louis, and Detroit. Discussions are underway among the different public institutions providing marketing services to the area regarding the future and possible reinstatement of some form of communications on pricing for selected horticultural crops. (Woods)

Rust Diseases that Affect Fruit Crops

Prolonged springtime wet periods this past growing season resulted in high levels of rust diseases of several landscape trees. The rust diseases have complex life cycles, often involving more than one host plant.

<u>Apple and Hawthorn Rusts Having Cedar or Juniper as Alternate Hosts</u>

Three related rust diseases occur on landscape apple, hawthorn, and related trees, and on cedars and junipers in Kentucky: cedar-apple rust, cedar-hawthorn rust and cedar-quince rust. All three rusts are caused by different species of the fungus Gymnosporangium, each of which must spend a phase of its life cycle as a parasite on Juniperus species such as native red cedars or ornamental junipers, and another phase on roseaceous hosts such as apple and hawthorn.

In general, cedar rusts go through distinct growth stages on their different hosts. Beginning in springtime on the diseased cedar,

usually in a gall, the fungus produces a highly visible bright orange telial stage, with teliospores.
From the teliospores, microscopic basidia and basidiospores develop and are conveyed by air currents to the nearby apple, hawthorn, or related host where, during moist periods, they infect leaves, fruit, or twigs. Some weeks later, the fungus produces a fruiting structure called a pycnum with specialized spores which are important for sexual reproduction.

In the same tissues, the fungus then develops an aecial stage with aeciospores. In summer, aeciospores carried by air currents then infect nearby cedars or junipers, the alternate host of the fungus. After about eighteen months in the cedar, the rust fungus life cycle finally returns, in the second springtime, to the orange telial stage.

Cedar apple rust (Gymnosporangium juniperi-Virginianae) causes orange colored leaf spots and defoliation of Crabapple, apple, and occasionally hawthorn. Yellow leaf spots appear in spring on the upper leaf surface and by late summer, the spots enlarge to the leaf underside, becoming more orange with whitish tubular spore-bearing structures (aecia). Cedar apple rust only occasionally affects twigs or fruit. On cedar and juniper, rust infections result in brown, spherical galls an inch or so in diameter, and sometimes twig dieback. Gall surfaces are marked by regular, circular depressions. In springtime, galls become bright orange with spore horns of the fungus.

Cedar-hawthorn rust (G. globosum) appears on hawthorn, crabapple, apple, pear, quince, serviceberry, and mountain ash. Leaf spots are similar in appearance to cedar-apple rust, but few of the tubular aecia form within them. Cedar-hawthorn rust occasionally affects twigs and fruits of their hosts. On red cedars and several landscape junipers, galls produced by cedar-hawthorn rust are similar in appearance to those of cedar-apple rust, but are smaller, more irregular in shape and do not develop the regular arrangement of circular depressions. Spore horns, too, are shorter, generally fewer in number and are wedge or club-shaped.

Cedar-quince rust (G. clavipes) is the most damaging of the cedar rusts and it affects many hosts including hawthorn, crabapple, apple, serviceberry, mountain ash, quince, flowering quince, pear, photinia, medlar, chokeberry, and cotoneaster. Cedar-quince rust normally does not cause leaf spots, but twig and fruit infections are common and sometimes damaging. Young, green hawthorn and crabapple twigs and thorns infected by the cedar-quince rust fungus can become swollen, cankered, and die. Most cedar-quince rust infected fruits are enlarged with protruding white, tubular aecia emerging from them. Infected apple fruits develop a corky texture. Cedar-quince rust also affects cedars and junipers but it does not form rounded galls. Instead, this rust forms perennial, spindle-shaped swellings on the twigs, upon which a gelatinous orange mass of spore horns is borne in the spring.

<u>Disease management</u>
1) Grow resistant apples crabapples, hawthorn, mountain ash or junipers. Lists of some of these rust-resistant plants are available in U.K. publications, ID-21,“Disease and Insect Control program for Home Grown Fruit in Kentucky including Organic Alternatives, and ID-88, "Woody Plant Disease C ontrol Guide for Kentucky”and ID-93, “midwest Tree Fruit Handbook”. 2) Destroy nearby wild, abandoned or worthless apples,
crabapples, hawthorns, cedars or junipers. When practical, prune out and destroy rust galls found on ornamental junipers and cedars. Although landscape plants may occasionally become infected by spores produced up to several miles away, most infections result from spores produced on infected Juniperus within a few hundred feet of the landscape.
3) Follow a recommended fungicide control program such as that found in ID-21 or ID-92 available through local county Extension offices.

<u>Pine Rust Diseases</u>

In some circumstances, rust diseases can be very destructive to pines in Kentucky. Pine rust diseases are found more commonly in forest than in landscape environments. Like most rusts, pine rusts have alternate host plants, dicots such as oaks, currants, and

asters. Often, these dicots are little damaged by the rust disease they host.

In general, pine rusts go through distinct growth stages on their different hosts. Beginning on the diseased dicot host plant, the fungus produces a telial stage with teliospores. From the teliospores, basidia and basidiospores develop and are conveyed by air currents to the nearby pine. Some weeks, months, or years after infecting the pine, the fungus produces spermagonia and specialized spores called spermatia which are important for sexual reproduction. Still in the pine, the fungus then develops an aecial stage with aeciospores.This stage is sometimes characterized by swelling of affected pine tissues. Aeciospores carried by air currents then infect the nearby alternate host plant. On the dicot, uredia and urediospores which can reinfect the dicot are produced before the rust fungus life cycle finally returns to the telial stage.

Pine Needle Rust (Coleosporium asterum), Eastern Gall Rust (Cronartium quercuum) Western Gall Rust (Endocronartium harknessii), and Fusiform Rust (Cronartium quercuum f. sp. fusiforme) do not use fruit crops as alternate hosts.

White Pine Blister Rust (Cronartium ribicola) affects eastern white pine producing girdling cankers which are very destructive. Although the alternate hosts, currant, gooseberry, and other Ribes spp. grow in Kentucky, the disease is not very common here. Where it is common, regulations prohibit the growing of the alternate hosts near white pine.

Disease Management

1) Avoid growing pines near alternate hosts, or remove the alternate hosts, if possible.
2) Remove and destroy pine galls, or if necessary, trees with galls to break the disease cycle.

Reduced-Risk Pesticides Registered

Since July, 1993, applicants have sent thirty-nine new chemical or new use submissions to EPA's Office of Pesticide Programs (OPP) for consideration as reduced-risk pesticides. Of the thirty-nine, twenty-two have been accepted by OPP as reduced-risk candidates; and

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sixteen have been rejected. Of the twenty-two accepted, fourteen have been registered. The following is a list of the registered pesticides by accepted common names (if available) and their trade name (in parenthesis): hexaflumuron (Recruit) - below ground termiticide; flumiclorac-pentyl (Resource) - herbicide; methyl anthranilate (Rejex-It) - bird repellent; tebufenozide (Confirm) - insecticide; hymexazol (Tachigaren) - fungicide; fludioxonil (Maxim) - fungicide; (Cadre) - herbicide; (Mefenoxam) - fungicide; spinosad (Spinosad) - insecticide; azoxystrobin (Heritage) - turf fungicide; alpha-metolachlor (CGA 77102) - herbicide; hexaflumuron (Recruit) - above ground termiticide; imazamox (Raptor)- herbicide; azoxystrobin (Heritage) - fungicide on fruits, (EPA Pesticide Registration Notice 97-3, Sept. 4, 1997)

John Strang, Extension Horticulturist

REGISTRATION FOR MANAGEMENT FIRST FOR APPLE IPM
March 9 & 10, 1998
Rough River State Park

I wish to register the following for this work shop.

Name_____

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_____Number registered @ $25 each.

Total enclosed_____

Make checks payable to:
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Mail to:
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