RESEARCH AND INDUSTRY NEWS

Farmers Must Look After Themselves

In a recent editorial in The Packer Bruce Obbink, president of the California Table Grape Commission stated that "One thing you can be sure is that neither the government nor the American public is going to look after farmers' needs nor work to ensure their future. Farmers have to look after themselves. The decision before them is whether to move into the future as organized, cooperative, commodity-specific groups, or as individual farmers going it alone. The choice is theirs to make." The Hawaii Farm Bureau Federation should be commended for helping set up a State-Wide vegetable action group to help organize the local vegetable industry, and to help conduct the Industry Analysis process. The action group has met several times over the past year to iron out specific implementation tasks to better organize the industry through a series of local and island grower committees.

On 26 October The Farm Bureau Vegetable Action Group met with University of Hawaii College of Tropical Agriculture Dean Noel Kefford, Assistant Director Ken Rohrbach, and Vegetable Specialist Hector Valenzuela to discuss concerns that the industry has with respect to applied research and extension programs at CTAHR, and to discuss the vegetable industry analysis. Communication was listed as the top concern with regards to understanding more about the role of CTAHR, and with regard to better identifying industry concerns and opportunities. Dean Kefford commended the Action Group for their leadership and organizational efforts, and indicated the Action Group itself should be a medium for both 1) communicating to CTAHR its main concerns, and 2) prioritizing bottlenecks and opportunities for the industry analysis.

In the end the real question, as Mr. Obbink describes comes to: "Is an industry better off with a common goal, such as increased consumption, or is it better off if each grower and shipper go at it alone?" The fact is that the industry is changing fast, along with incoming waves of new government regulations and an increased competitiveness in the market place. Those industries that survive will be the ones that are well organized and which learn to adapt and grow in a fast moving business environment. At the personal level commitment and an ongoing communication are essential to establish an organizational unit.

If you, as a producer or shipper, have a concern about the industry or about the educational process provided by the Cooperative Extension Service, pick up the phone and let your concern be heard. Attend industry meetings and let your voice be heard. Otherwise no one will know about what is in your mind. In this tough economic times it is even more imperative that we polish our organizational and communication skills. Growers concerned with the role of the University or with industry support organizations, need to ask themselves, when is the last time that I asked for help. As a colleague of mine put it, "Communication is a two-way street. We need to talk to each other, especially when there is a problem."
Sweet Corn Insect Control
Several insects may attack commercially grown sweet corn. Some feed on the crop below the ground while others feed on plants above the ground. There are three insects which may feed at ground level or below the soil surface which may be of economic importance. These are southern corn rootworms, wireworms and cutworms.

Southern corn rootworm (larvae of the cucumber beetle) damages sweet corn by feeding on and tunneling inside roots. Worms may also bore into the corn stalks just above the roots, eating out the crown of young plants and killing the bud. There may be several generations per year.

Surface black cutworms are generally found attacking our sweet corn. Infestations are more common in low-lying, damp fields with higher organic matter. Larvae exhibit three different feeding habits depending on stage of growth. Young larvae (first and second instars) feed on the leaf surface giving it a scuffed appearance. The late second and early third instars will eat holes in the leaves. Larvae then move from the leaf area into the soil and begin feeding by cutting plants at the soil surface. Sometimes cutworm damage is spotty in given fields, and replanting of these areas may be more economical than applying chemical controls.

Control of these soil insects may be accomplished with the use of pesticides. Southern corn rootworms and wireworms may be controlled at planting using in-furrow or band applications of Counter 15 G*, Furadan 15 G*, Dyfonate 1120 G*, Lorsban 15 G, or Diazinon 4 EC (for wireworms and adult corn rootworms). Higher rates are generally necessary for wireworm control.

For cutworm control use soil surface applications of Lorsban 4 EC, Sevin XLR, 80 WP, or 50 WP. Cutworm activity occurs mostly in late afternoon. Therefore, time your application to coincide with their activity. Timing insecticide applications are important in your total insect control program (Harris, JP 92:2(1992).

Sweet Corn Caterpillar Control
Earworms and fall armyworms may feed as budworms. Both feed on the leaves and in whorls creating a ragged appearance. Hence the term "budworm". If infestations are severe, complete loss of leaves or buds can occur. When an average of one worm per two plants to one worm per plant is found, control can be justified. Insecticides should be mixed with 20 to 30 gallons of water per acre with flood nozzles directed into the whorls. Remember, these insects are in very protected areas, and the volume of water is extremely important in getting insecticides to insects. For budworm control use label rates of Lannate L*, or Sevin XLR or 80 WP.

Earworms also cause damage to ears of corn especially at the silking area or tip end of ears. The adult moths lay their eggs on the silks and hatching occurs in two or three days. The young larvae feed and work their way through the mass of silks to the tip of the ear where they feed on the kernels. Worms are almost impossible to control once they work their way through the silks to the developing kernels. To obtain satisfactory control with an insecticide, make foliar applications at 3 to 5 day intervals to the ear zone. Applications should be continued as long as green silks are present. For earworm control use foliar applications of Ambush, Pounce, Lannate L, or Sevin XLR or 80 WP. Keep in mind that certain hybrid varieties of sweet corn are susceptible to lannate injury. Treat a small area to determine crop safety before full scale spraying (Harris, JP 92:2(1992).

Stinkbug Control
Stink bugs may attack sweet corn, especially in the southern part of the state, and cause extensive damage. They may damage seedlings and growing plants. They suck sap from plants causing the whorl area to become yellow and sometimes die. The most frequent and serious damage occurs when they probe through the shuck of a developing ear of corn and suck the juice from individual kernels. This damage may open entrances for molds and other insect pests to cause extensive damage.

Begin scouting sweet corn regularly for stink bugs around the 7th or 8th week after emergence. If you find an average of one bug per two plants to one bug per plant, fields should be treated. Continue to scout fields after treatment because adult stink bugs are strong fliers and additional infestations may develop. For stink bug control use foliar applications of methyl parathion, or Sevin XLR or 80 WP (Harris, JP 92:2(1992).

Stink Bugs in other vegetables
Conditions have been ideal for high stink bug populations this year. Green and brown stink bugs are generally our major problem. Damage is caused by nymphs (immatures) and adults sucking sap from the pods, buds, blossoms, fruits, and seeds. Removing liquid contents of the developing seeds causes them to become flattened and shriveled; fruits are deformed and dimpled. Egg hatch occurs in about 5 to 7 days. After 5 nymphal instars (growth stage), the adult stage is reached about 6 weeks later, depending on species and weather conditions. Adults usually live 40 to 60 days during the summer. A new generation occurs every 5 to C weeks during the summer.
Control stink bugs when they first appear. Nymphs are less mobile and easier to control. All stages may be controlled with *Asana XL, *Pydrin 2.4 EC, methyl parathion, Sevin XLR or 80 WP, or Thiodan 3 EC depending on the crop to be treated. Check labels for rates, usages precautions, and crop registration (Harris, JP, 92(6)1992)).

**Pinworms on Tomatoes**

Pinworms are tiny caterpillars (1/4 inch when full grown) yellowish, gray, or green with purple spots and a brown head. They bore holes into buds and ripening fruit near the stem. Larvae also feed as leaf miners and may cause white blotches on leaves that are folded together or on leaves that are held together by webs.

These pests may be controlled with label rates of *Asana XL, *Guthion 50 WP, *Lannate 1.8 SL, or *Pydrin 2.4 EC. Read labels carefully for rates, usages, and precautions (Harris, JP, 92(6)1992)).

**Effect of Powdery mildew on percent stems surface affected and on yields of Pumpkin.**

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<tr>
<td></td>
<td>% Stem Surface Affected</td>
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<tr>
<td>Ghost Rider</td>
<td>12.5</td>
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<td>4.9</td>
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<td>Funny Face</td>
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<td>9.2</td>
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<td>21.7</td>
<td>8.0</td>
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<td>11.7</td>
<td>5.5</td>
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<tr>
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<td>NA</td>
<td>5.8</td>
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<td>13.3</td>
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<td>21.9</td>
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<td>Big Max</td>
<td>0.0</td>
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2. Part of yield increase also attributed to control of downey mildew. Fungicides (Dithane M45 and Bayleton 50W) were applied with an air blast sprayer (100 GPA) 6 times from Aug. 6 to Sept. 17.

**Powdery Mildew of Pumpkins and Squash**

Based on recent requests for information about powdery mildew on squash and pumpkin, it appears that growers need to know more about this problem. It's important to realize that at this point in the season, application of a fungicide in an attempt to reduce levels of powdery mildew probably would not be advisable. While it is true that a fungicide such as Bayleton 50 DF or 50 W can "eradicate" part of powdery mildew infection, taking care of part of the problem may still leave too much disease. The key point of this article is to make you aware of powdery mildew, and point out the best mildew management strategies for next season.

Powdery mildew is the most important foliar disease of pumpkin and squash in Mississippi. This fungus disease generally shows up from mid- to late summer, and if left unchecked, can present problems. When powdery mildew becomes heavy, severe defoliation may result. In turn, this can lead to premature ripening and reduced fruit size.

The first foliar sign of powdery mildew is a whitish talcum-like powdery growth, frequently starting on the shaded underside of crown leaves. The areas of white mildew growth expand and eventually cover most of the leaf surface. Such leaves may wither and fall.

Most of the powdery mildew found in the state on these crops is thought to be caused by *Erysiphe cichoracearum*. The white, powdery spores are blown from plant to plant or field to field by the wind. These spores may begin a new mildew infection on susceptible leaves if humidity is high and temperature is near 80F. The disease does not require rain or leaf wetness for infection to take place. It may take only three to seven days for powdery mildew symptoms to appear following infection. Such large numbers of spores can be moved over a field by wind currents to initiate new disease cycles that a field can appear white within a short period of time.

Powdery mildew control is achieved primarily through timely application of fungicides. Early August is the time to begin treatments for pumpkins and squash planted for the fall market. Fungicides such as Benlate 50 WP at 0.5 lb per acre or Topsin M 85WDG at 0.4 lb per acre generally provide effective control when applied on a 14 day schedule. However, Bayleton 50 DF or 50W at 2 to 4 ounces per acre is the most effective treatment. A second application of Bayleton should be made about 18 to 21 days after the first. If rainy conditions persist during this period, it may be necessary to apply a protectant fungicide such as Bravo 720 for protection from other fungal diseases. Apply 7 to 10 days after the initial Bayleton application. This is an important consideration since the disease control spectrum of the latter fungicide is fairly narrow compared to Bravo. Bravo also provides
limited protection from powdery mildew but should not be relied upon under conditions of heavy powdery mildew pressure. Fungicide should be applied in sufficient volume of water to achieve thorough coverage of vines. At least five gallons of water are required if fungicides are applied by fixed-wing aircraft. Pumpkin varieties differ in their susceptibility to powdery mildew, and most (with the exception of "Big Max") need fungicide protection. The figure above should be useful in helping plan your 1993 pumpkin disease management program (Killebrew, F. 92(9))

Botrytis Gray Mold on Greenhouse Tomatoes

Experienced greenhouse tomato growers realize the importance of maintaining a preventative program for Botrytis gray mold. New growers should become familiar with the basic biology of the gray mold fungus as a means of better understanding what it takes to keep this disease in check. Botrytis gray mold is the most common and troublesome greenhouse tomato disease for several reasons: First, gray mold resistant varieties are not available. Second, Botrytis cinerea, the fungus which causes gray mold disease, is present in all greenhouses. And, finally, growers frequently fail to maintain relative humidity levels below 90%. A period of several hours at 90% or higher relative humidity is ideal for B. cinerea spore germination and plant infection. Once gray mold infection becomes widespread within a greenhouse, control becomes more difficult, since infected plants are difficult to "cure." All of these point to the importance of staying ahead of gray mold through preventive disease management techniques. In Mississippi and other Southern states, late fall months are worst for gray mold because there is an abundant amount of herbaceous vegetative material (crop refuse and dying summer plants) available for fungus colonization. Consequently, many B. cinerea spores are pulled into greenhouses by the exhaust fans and are present in the air and on plant surfaces. However, gray mold can become a problem at any point in the season. Growers who carry a fall crop through into the spring are especially likely to see gray mold. This is because carryover plants are more susceptible to B. cinerea invasion due to the number of possible invasion points on stems, presence of senescent tissue, and humidity. Humidity is more of a problem in carryover crops because of the reduced air movement with heavy foliage present. While B. cinerea can invade any aerial part of the greenhouse tomato plant, the fungus does not attack healthy green tissues such as leaves and stems unless (a) an injured or dead area is present, or (b) it grows directly from a food base such as a fallen petal or leaf. The fungus will first colonize the food base and then attack healthy tissues. Although B. cinerea is capable of growth within a wide range of temperatures from about 28°F to 90°F, growth is slow at the extremes. Optimum temperature range for growth is 68° to 77°F. The gray mold fungus is particularly troublesome under conditions of cool to moderate temperatures and high relative humidity (90% or greater). Moisture is more often a limiting factor in plant infection than temperature. Free moisture is necessary for growth within plant tissues, and low humidity may result in arrested growth of the fungus. However, growth can resume when moisture again becomes available. The most characteristic sign of gray mold is the brown to gray mass of fungus growth that appears over the point of invasion. Clouds of spores can be shaken from this growth after periods of high humidity. Spores are produced in tremendous numbers and are spread over the greenhouse, serving as secondary inoculum. Since the period of time from initial plant infection to production and dispersal of spores can occur in as little as four days, a large number of plants may be infected in the greenhouse within a short period of time. Senescent petals are quite susceptible to gray mold fungus invasion. The fungus may grow from the infected petals into the sepals before the petals dehisce, and from there it may grow into the developing fruit. Also, infested petals may remain attached to the fruit, and the fungus then grows into the fruit directly. As a result, the disease often occurs at the stem end or blossom end of fruit. The production of halos, called ghost spots, on the fruit is a unique symptom of this disease. This phase of gray mold occurs after spores germinate on the surface of the fruit, germ tubes penetrate it, and the infection is aborted. This results in the formation of the white halo or ghost spot. Control of Botrytis gray mold is largely dependent on using a combination of cultural practices (greenhouse relative humidity control), sanitary practices, and timely use of Exotherm Termin fungicide. Recent label changes for Benlate and Botran fungicides mean these products can no longer be used for control of gray mold or other diseases of greenhouse tomatoes. Provided that sanitary practices to limit fungus carryover from previous crops are carried out, greenhouse humidity levels are maintained below 90%, and other cultural practices, impact of gray mold, leaf mold, and several other important diseases can be minimized. The following information prepared by Dr. George Hochmuth of the University of Florida Cooperative Extension Service underscores the need for maintaining a good greenhouse ventilation system and ways to keep the relative humidity level under control. "Air movement within the greenhouse is very important to the management of temperature and the control of disease. Since natural air movement in greenhouses is minimal, growers must use various means to mechanically move air within the house. Air movement is especially critical during the winter months because this is one of the major methods to control Botrytis gray mold and several other fungus diseases. "In the winter, warm air rises at night and its moisture condenses on the cooler plastic causing the familiar problems with condensation and dripping. Moisture also condenses on the cooler leaf surface within the greenhouse. The free water either dripping from the ceiling or collecting on the cooler leaf surface helps provide ideal conditions for Botrytis gray mold, and the other fungus diseases. Without disease resistance to gray mold, and limited availability of fungicides, the greenhouse grower is left with environmental management as the major means of controlling these diseases. The chief objective in environmental control is to maintain dryer conditions in the greenhouse through air movement. Air movement is achieved by one or more of three major systems. These systems include the large ventilation exhaust fans, the polytube/jetfan system, or horizontal airflow fans. In cool weather conditions of winter, ventilating with the large exhaust fans generally results in more cooling than is desired. However, exhaust fans can be used periodically in combination with motorized winter vents to pull outside air through the Greenhouse on warm sunny days. "During the night and on cool days, air movement within the greenhouse can be achieved by either the polytube system or horizontal airflow fans. These systems rely on moving the air within the
The polytube system is commonly found in greenhouses mainly as part of the heating system in combination with a jet fan. This system can be used for ventilation by operating the jet fan without heat input. The main problem with the polytube system when used strictly for ventilation is that lateral air movement is generally not enough to achieve uniform drying of plants in the greenhouse.

"Horizontal airflow units are small fans that are hung just above plant height and move air in circular fashion around the greenhouse. In a typical 120 by 35 ft. greenhouse, two small fans (approx. 1/4 horse power) on each side of the greenhouse would probably suffice. These fans should be located to move air up one side and down the opposite side of the greenhouse. The fans on either side should be located approx. 1/4 to 1/3 of the distance from the end walls and 4 to 6 feet from the side walls. Horizontal airflow fans would probably be a good idea for improving air movement in greenhouses, even in houses with existing polytube heating systems. This is because horizontal airflow fans can achieve better air movement for purposes of disease control than polytube systems. The horizontal airflow fans can be used in conjunction with the polytube system for assisting in movement of heated air about the greenhouse. This system would probably be a cheaper approach for those growers having existing jet fan and polytube systems and who do not wish (because of cost) to convert to ground floor heating." (Killebrew, F. 92:10(1992)).

Allelopathy in Taro
Taro residues incorporated in a sand growing medium reduced seminal and lateral root growth on sorghum. The allelopathic substances in taro blocked either root cell division or extension and growth according to the work conducted at Nagoya University in Japan (Pardales et al. Ann. Bot. 69:493(1992)).

Fresh Processing
What is the future of “Fresh Processing” in Hawaii for the Vegetable Industry? In the continental US the trend seems to be gaining momentum. “Fresh Processing” consists of preparing ready-to-eat vegetable mixes in plastic bags or trays. The packages may consist of 12 to 16 inch trays, or 2.5 to 3 pound cello bags of salads, spinach, coleslaw, carrots, celery and alfalfa sprouts. What about a ready-to-go package to take for hiking or to go to the beach?

UH Horticulture Faculty Honored
Dr. Jim Brewbaker, a faculty of the UH Horticulture Department was selected to receive the 1992 Genetics and Plant Breeding Award by the National Council of Commercial Plant Breeders. This award recognizes Dr. Brewbaker's many achievements in the field of corn genetics and plant breeding. Dr. Brewbaker recently published his 200th scientific publication.

The Marketing Corner
California’s Horticultural Industry (..., and Ours)
California’s agricultural industry $18 billion farm-gate value has a multiplier effect representing $63 billion in total revenues, accounting for 9% of the state’s economy (Packer, Aug. 15, 1992). Agriculture’s contribution to the economy is frequently undervalued. In Hawaii, what is the contribution of the produce industry to the 7 million tourist and restaurant industry? (I estimate that on the average 135,000 tourists are in the state daily.) What is the social and economic value of the thousands of vegetable back-yard gardens being kept year round throughout the islands? Because most of this goes unrecognized, our legislators often look the other way. The industry should make an effort, along with educational agencies to better communicate the true contribution of horticulture to the local economy.

Yields of lettuce cultivars resistant and susceptible to corky root in continuous culture for 6 yrs (A&B), continuous culture for 3 yrs. (C), or in rotation after sugarcane (D&E) (Alvarez et al. HortSci. 27:66(1992))

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UPCOMING EVENTS


13th Annual Ecological Farming Conference. 20-23 Dec. Colfax, California. Contact the Committee for Sustainable Agriculture, POB 1300 Colfax, CA 95713, Tel. 916-356-2777.


American Society for Plasticulture, 24th National Agricultural Plastics Congress, 4-8 June, 1993. Doubletree Hotel, Overland Park, Kansas. For more information contact Carl Hoefer, POB 860238, St. Augustine, FL 32086, tel. 904-794-2356.

American Society for Horticultural Science 90th Annual meeting. 24-29 July. Knoxville, Tenn. Contact Christine Radiske at 703-836-4606.

RESOURCES


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