



# RESEARCH UPDATE 1991 FRUITS & VEGETABLES

## Sweetpotato Clones Show Variable Yields

Nine sweetpotato clones were evaluated in AAES research at the E. V. Smith Research Center, Shorter, and Chilton Area Horticulture Substation, Clanton. Plantings were made in late June, using between- and within-row spacings of 42 and 12 inches, respectively. Per acre rates of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O were 90-70-150 pounds at Shorter and 50-100-150 at Clanton. Fertilizer was incorporated at planting at Clanton. At Shorter, all fertilizer except half of the nitrogen was incorporated at planting; the remaining nitrogen was applied 6 weeks later. Irrigation was used at Shorter but not at Clanton. Harvest was made 115 days after planting at Shorter and 123 days after planting at Clanton. Detailed results are given in the table.

Shorter results. Highest yields of

U.S. No. 1, canner, and total marketable were obtained with L-86-33 and Cordner. Yields of MD-607, NC-1406, and Beaugard were considerably

less than yields of L-86-33 and Cordner. Poor yields were produced by Jewel, Georgia Red, Nugget, and TI-155. Georgia Red's production of 464 bushels per acre of culls indicates that variety's high yield potential.

Clanton results. Highest yields of total marketable roots were obtained with MD-607, Beaugard, L-86-33, and TI-155. Highest

yields of jumbo roots were obtained with TI-155 and Cordner. Lowest marketable yields were produced by NC-1406, Georgia Red, and Nugget.

Trends in U.S. No. 1 yields were similar to trends in total marketable yields at both locations. Yields were lower than expected at Clanton because of poor stands.

J. M. Dangler, W. T. Hogue, and J. M. Pitts

Clone	Yield/acre, Shorter			Yield/acre, Clanton		
	U.S. No. 1	Canner	Marketable	U.S. No. 1	Canner	Marketable
	Bu. <sup>1</sup>	Bu.	Bu.	Bu.	Bu.	Bu.
L-86-33 .....	240	39	306	65	23	95
Cordner .....	152	46	203	44	19	74
MD-607 .....	98	25	126	76	32	120
NC-1406 .....	99	25	125	32	22	57
Beaugard .....	83	24	122	74	25	107
Jewel .....	51	18	85	65	23	88
Ga. Red .....	45	22	70	33	16	51
Nugget .....	34	21	61	26	18	47
TI-155 .....	5	3	9	40	19	83

<sup>1</sup> Bushel = 50 pounds.

## Black Plastic Mulch Increases Muskmelon Yields

The use of black plastic mulch in the production of vegetable crops has received greater attention as farmers consider vegetable production as an alternative farm enterprise.

Black plastic mulch and row covers offer greater latitude in crop production systems, with the potential for two- to three-fold increases in yields and earlier maturity of certain crops.

An AAES study focusing on the use of black plastic mulch and row covers in the production of muskmelons was conducted on a sandy loam soil (ph

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### Black Plastic Mulch, continued

7.1) in Jefferson County, Alabama. Treatments were: (1) black plastic mulch (BPM), (2) BPM plus clear, slitted plastic (CSP) row tunnel, (3) BPM plus white, tinted, slitted plastic (WTSP) row tunnel, (4) BPM plus spunbonded polyester (SPE) floating row cover, and (5) bare soil (control). Fertilization and weed and pest control were according to recommended practices, and irrigation was applied as needed.

On April 12, BPM (3 mils thick, 3 feet wide) was applied to rows 20 feet long, spaced 5 feet apart. AU-Rora muskmelons, seeded in peat cubes in March in the greenhouse, were field transplanted in April and spaced 2 feet apart within rows. Shortly after transplanting, the different row cover materials were applied over the row. After 3 weeks, row covers were removed; however, BPM remained in place as a mulch.

Mulches and row cover treatments were the most productive, ranging

**Table 1. Effect of Black Plastic Mulch and Row Cover on Production of Muskmelon**

Treatment	Production	
	Early <sup>1</sup>	Total
	Pct.	No.
BPM .....	67	8,385
BPM plus CSP .....	73	9,910
BPM plus WTSP .....	39	7,841
BPM plus SPE .....	73	8,382
Bare soil .....	28	3,812

<sup>1</sup>Harvested June 20-30 as a percentage of the harvest period extending through July 14.

from 105 to 160 percent increase in yield, with 39 to 73 percent of total production during the first 2 weeks of the harvest period, table 1. The lowest yield was on the bare soil treatment, which produced only 28 percent of melons during the first 2 weeks of the harvest period. Higher yields and early maturity with BPM and row covers reflect an increase in air and soil temperatures in the plant-growing environment, table 2, as well as increased soil moisture content and decreased weed population. Increased vine growth 3 weeks after

**Table 2. Air and Soil Temperature as Affected by Black Plastic Mulch and Row Cover**

Treatment	Av. 2 p.m. temp.	
	Air	Soil
	Deg. F	Deg. F
BPM .....	86	80
BPM plus CSP .....	108	85
BPM plus WTSP .....	93	79
BPM plus SPE .....	96	82
Bare soil .....	79	76

<sup>1</sup>Recorded daily for 3 weeks following establishment.

field planting was positively correlated with an increase in melon maturity under the row covers.

When compared to the bare soil check, all treatments produced higher yield and greater economic returns, and melon size was the same for all treatments. If earliness of production takes preference over total yield, the BPM plus WTSP and the bare soil treatments, respectively, would be the last choice of production practices.

J.E. Brown and T.A. Glover

## Surfactant Promising as Peach Thinner

Fruit thinning to a suitable crop load is one of the costliest production practices for peaches in years when trees set a heavy crop. Currently, hand thinning is required because there are no chemical thinning materials available for use. Current research is centered on blossom thinning since there are no promising fruit thinning agents being developed.

Materials that desiccate blossoms, such as ammonium nitrate, ammonium thiosulfate, and surfactants, have been evaluated as a means of removing a portion of the potential peach crop by destroying part of the blossoms. However, the fertilizer materials ammonium nitrate and ammonium thiosulfate have not consistently removed an adequate number of blossoms to satisfy the thinning requirement.

In 1990 AAES tests, applications of

the surfactant Triton AG-98 showed promise as a blossom thinner. A single application of Triton AG-98 was made during full bloom using a hand-held nozzle

on a tractor-mounted sprayer, applied to the point of run-off. Rates evaluated were 0, 2, 4, and 6 percent on Surecrop peaches. The fruit on the untreated trees were hand thinned to a normal crop load for comparison with the four rates of Triton AG-98.

Blossom thinning resulting from Triton AG-98 increased linearly with increasing rates, see table. Fruit number and fruit total yield decreased and average fruit weight

**Effect of Triton AG-98 on Surecrop Peach, 1990**

Rate of Triton AG-98	Percent blooms removed	Total fruit	Total yield	Average fruit weight	Fruit 2 1/2 inches or larger
	Pct.	No.	Lb.	Oz.	Pct.
None .....	17	784	191	4.0	65
2.0 pct. ....	52	555	157	4.8	78
4.0 pct. ....	73	292	96	5.4	85
6.0 pct. ....	72	284	88	5.1	89

and the percent of the crop 2 1/2 inches and larger increased with increasing rates of Triton. This indicated over-thinning with the higher concentrations of Triton. The 2-percent rate of Triton resulted in the most promising degree of thinning and eliminated the need for further hand thinning. However, more refinement in application rates is needed.

W.A. Dozier, Jr., A.W. Caylor, J.A. Pitts, and K.S. Short



## Auburn-Developed Plums Adapted to Commercial Market

Two new AAES plum cultivars, AU-Rubrum and AU-Rosa, have the appearance and taste that consumers prefer and quality that commercial growers demand. Both varieties have proven to be high yielding and relatively free of diseases that restrict production of other commercial cultivars in Alabama.

In cooperative tests at the USDA's R.B. Russell Research Center in Athens, Georgia, AU-Rubrum met storage and shipping requirements in extensive tests.

AU-Rosa performed as well in limited tests, with additional experiments planned for next year. Plums were picked at the half red color stage and

stored at 32°F for 5 weeks and then ripened at 68°. The plums developed a full red color with no significant loss in quality when compared to tree-ripened fruit.

The USDA tests confirm that AU-Rubrum and AU-Rosa have the kind of storage and shipping qualities needed for commercial cultivars. Most plums currently found in supermarkets are Japanese types that are grown in California.

The two varieties averaged more than 100 pounds of fruit per tree by the fourth year of growth in Alabama tests. Data on fruit characteristics and disease response are listed in the table.

J.D. Norton, G.E. Boyhan, and  
B.R. Abraham

Fruit Characteristics and Disease Response of Cultivars

Variety	Fruit characteristics		Disease index <sup>1</sup>		
	Size	Soluble solids	Bacterial leaf spot	Black knot	Plum leaf scald
	In.	Pct.			
AU-Rosa .....	2.0	17.6	0	0	1
AU-Rubrum .....	1.9	15.6	0	0	1
Santa Rosa .....	1.7	16.7	5	5	5

<sup>1</sup>Disease index: 0=0, 1=1-20, 2=21-40, 3=41-60, 4=61-80, and 5=81-100 percent of fruit, leaves, and trees infected.

## Drip Irrigation and Black Plastic Mulch Promote Bell Pepper Yields

The use of black plastic mulch and drip irrigation has increased greatly in recent years in efforts to increase crop yields and maximize economic returns. Use of this cultural practice in the production of bell peppers was studied at the Sand Mountain Substation, Crossville, to evaluate plant growth and performance.

Four treatments were included: (1) black plastic mulch alone, (2) black plastic mulch plus drip irrigation, (3) bare soil plus drip irrigation, and (4) bare soil alone. Recommended herbicide and fertilizer applications were

Effect of Black Plastic Mulch and Drip Irrigation on Pepper Production

Treatment	Marketable yield/acre			Culls
	Lb.	No.	Pct.	
Black plastic + drip ....	19,125	76,375	16	
Black plastic .....	17,320	69,764	14	
Bare soil + drip .....	8,874	41,532	23	
Bare soil .....	3,033	13,844	29	

made just prior to planting, and an additional 45 pounds per acre of actual N was sidedressed when the pepper plants began to flower.

Black plastic mulch (1.5 mil and 3 feet wide) and the drip irrigation tubing were laid simultaneously with a plastic layer on rows in plots 20 feet long, spaced 7 feet apart. Bell pepper (Keystone Resistant #4) was trans-

planted on May 6, through punched holes, spaced 18 inches apart in the row in black plastic mulch and on bare soil. Peppers were harvested as needed from July 19 to October 4.

Yields of bell peppers were similar with the black plastic mulch plus drip irrigation and black plastic mulch alone treatments, see table. These treatments produced 8 and 7 tons more per acre, respectively, than on bare soil without drip irrigation.

Percentage of cull fruits was greater on the bare soil treatment than on the other treatments. As in other studies, fruits produced on bare soil were more likely to be stressed and affected by pathogenic organisms than fruits produced on black plastic and under irrigation. On plots where mulch was used, pepper fruits were prevented from contact with the ground, which may increase the number of marketable fruits.

J.E. Brown, J.T. Eason, M.E. Ruf,  
and D.W. Porch

## Pole Bean Variety Trials Provide Useful Comparisons

Pole beans are widely grown in Alabama home gardens and for local fresh markets. And there is increasing interest in commercial production. Dade, McCaslan, and Kentucky Wonder 191 are traditional varieties, but several new varieties have also been introduced. These new ones were tested along with familiar varieties in 1990 at the Chilton Area Horticulture Substation, Clanton, and North Alabama Horticulture Substation, Cullman. Data from the Cullman location are reported here.

The Cullman trial was planted May 1, 1990, with plants spaced 6 inches apart in 5-foot rows. A two-wire string trellis was used in growing the 16 varieties. All had green pods

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**Pole Bean Variety Trials, continued**

Pole Bean Variety Comparisons, North Alabama Horticulture Substation, Cullman					
Variety	Pod length	Pod width	Days to first harvest	Number of harvests	Total yield/acre
	In.	In.	No.	No.	Lb.
Alabama No. 1 .....	5.8	0.5	67	9	16,194
Belmonte .....	7.1	.6	49	13	19,794
Bertina .....	5.4	.5	56	10	21,533
Blue Lake .....	5.2	.5	57	11	10,088
Dade .....	6.4	.5	54	11	9,690
Genuine Cornfield .....	5.9	.5	67	9	14,361
Goldmarie .....	6.8	.6	49	13	18,293
Kentucky Wonder .....	6.7	.5	60	9	15,896
Kentucky Wonder 191 .....	6.3	.5	58	11	14,485
McCaslin .....	6.5	.5	58	10	8,562
Novax .....	5.2	.4	51	13	13,444
Precoces .....	6.8	.6	51	12	16,053
Rattlesnake .....	6.4	.5	60	9	20,067
Rinox .....	5.2	.5	56	11	16,799
Selma Star .....	5.9	.5	54	10	16,079
Selma Zebrina .....	6.2	.5	54	11	12,882

except Goldmarie, whose pods were yellow. Rattlesnake and Selma Zebrina had striped pods.

Although results in the table are preliminary (1 year only), growers may benefit from small plantings of

new varieties. Some of the varieties tested were of European origin and may not be found in local seed markets.

A.G. Hunter, M.H. Hollingsworth, and O.L. Chambliss

## New Watermelons Perform Well in Cultivar Evaluations

Sixteen watermelon varieties were evaluated in AAES trials during 1988-90 at five locations throughout Alabama. The ranges in yields for the five locations are recorded in the table, with varieties grouped as Charleston Gray, Jubilee, Icebox, and Crimson Sweet type melons.

**Charleston Gray type.** Charlee, a new release from the Florida Agricultural Experiment Station, gave the best overall results. It offers greater disease resistance than Charleston Gray.

**Jubilee type.** The AAES-developed AU-Jubilant compared favorably with the Jubilee cultivar in yield and quality. It has higher disease resistance than Jubilee.

**Icebox type.** Mickylee and Minilee were higher in yield, quality, and disease resistance than Sugar Baby. These melons also do not have the problem

Watermelon Yield Comparison, Range at Five Locations	
Variety	Range, lb./acre
<b>Charleston Gray type</b>	
Charleston Gray .....	18,126-29,274
Charlee .....	19,889-40,196
Sweet Charlie .....	17,794-33,148
Charleston Elite .....	14,531-30,825
<b>Jubilee type</b>	
Jubilee .....	15,343-25,881
AU-Jubilant .....	16,951-38,124
<b>Icebox type</b>	
Sugar Baby .....	10,388-20,202
Mickylee .....	13,768-29,251
Minilee .....	9,936-33,488
<b>Crimson Sweet type</b>	
Crimson Sweet .....	12,774-31,114
AU-Producer .....	17,919-30,486
Sugarlee .....	14-617-31,061
Dixielee .....	12,754-26,179
Mirage LS .....	20,386-51,996
AW-83-1001-CSY .....	12,952-30,596
Crimson Tide .....	19,541-38,803

of sun scald that Sugar Baby exhibits.

**Crimson Sweet type.** AU-Producer compared favorably with Crimson Sweet in yield, quality, and disease resistance. Sugarlee and

Dixielee, two varieties with high sugar content and intense red color, had a shorter storage life than others because discoloration developed in the flesh. The hybrids Mirage LS and Crimson Tide did extremely well. Hybrids generally have great vigor and uniformity, but seed costs are extremely high.

A yellow fleshed mutant of AU-Producer, identified as AW-83-1001-CSY, compared favorably with the Crimson Sweet types in yield, quality, and disease resistance. The yellow fleshed variety and another AAES line, AW-82-50CS, have performed well in the Southern Cooperative Watermelon Trials (at nine locations in the Southeast).

AW-82-50CS is an open pollinated line that has a deep red flesh and high sugar content. Its shape is similar to Crimson Sweet, but it has a light green rind with a dark green stripe.

J.D. Norton, G.E. Boyhan, and B.R. Abraham

## Trunk Wraps, Mist Irrigation Reduce Freeze Damage to Kiwis

Freeze injury is a potential problem for kiwi production in Alabama. Because of this, AAES research has investigated methods of protecting plants against freeze injury. Two approaches, wrapping of trunks and use of mist irrigation, showed promise in the tests.

The tests were conducted at the Chilton Area Horticulture Substation in the winter of 1989-90, with male selections AU-1M, Mutua, and Tomuri and female selections Hayward and AU-1F. Freeze prevention treatments compared were:

1. Five 13 1/2-inch-long Reese clip-on trunk wraps were stacked around the trunk of each plant and the joints sealed with duct tape to provide protection from the soil line

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### Trunk Wraps, continued

to the trellis wire.

2. Two Maxi-Jet mist nozzles were placed at each plant, one 39 inches above the soil line to wet the trunk and the other 22 inches above the plant to wet the canopy. Water application was controlled by thermostat to begin when air temperature dropped to 33° F. The jets delivered 10 gallons of water per hour at 20 p.s.i.

3. Other plants were left unprotected for comparison.

December 1989 was unusually cold, averaging 5 degrees below normal at Clanton. Temperatures dropped to 15° F December 16 and 17 and to 2°, 0°, 1°, 8°, and 24°, respectively, on December 22-26.

The trunk wraps were removed April 2, 1990, and vine damage determined. Winter-killed vines were cut back to the soil line April 10 and regrowth was measured in the fall.

Winter injury sustained by the 4-year-old vines was characterized by

bark splitting or death of the cambium layer, or both. Injury began near the soil line and extended up the vine trunk to 38 inches on unprotected plants and 5-6 inches on plants either wrapped or misted. Height of injury was greater on the AU-1M plants protected with trunk wrap and greater on Hayward protected with mist. There was no difference in trunk diameter among treatments, but vine injury was less with both trunk wrap and mist treatments than with no protection.

Variety differences were observed. There was less injury on Tomuri with the trunk wrap than with the mist treatment. None of the AU-1F vines protected by either treatment were injured, and wrapped Hayward plants were not injured. All unprotected vines of each cultivar were injured.

Most of the injured vines developed sprouts from the root system and the vines grew rapidly through summer. In October, the vines had grown the length of the allotted trellis space (8

feet), and had developed lateral branches. There were no treatment effects on cane length or number of lateral branches developing from the main cane.

Regrowth measurements show that trunk diameters were larger on mist-protected plants (1.2 inches) than on trunk-wrapped or unprotected plants (0.9 inch for both). The trunk diameter of Hayward, a weak-growing cultivar, was less than Mutua and Tomuri, but did not differ from AU-1M and AU-1F. There were no treatment effects on mortality of injured plants. However, 22 percent of the AU-1M and 11 percent of the Mutua plants died, whereas none of the Tomuri, AU-1F, and Hayward plants were killed. In addition to showing that freeze damage can be reduced by trunk wraps or low-volume mist irrigation, results also show that plants on their own roots sprout quickly to restore their fruiting potential.

W.A. Dozier, A.W. Caylor,  
D.G. Himelrick, and J.A. Pitts

## Dormex Helps Retain Fruiting Potential Despite Inadequate Chilling

Insufficient chilling was received at the Gulf Coast Substation in Fairhope during the 1988-89 dormant season to satisfy the chilling requirements of 17 cultivars of peaches and nectarines being evaluated there. All cultivars requiring 650 chilling hours or less bloomed and foliated during or before March except for one cultivar, La White. Some cultivars with reported chilling requirements of 750 hours, such as Sunbrite, Brighton, and Sunland, foliated and bloomed normally.

The trees were 4 years old and had foliated and fruited normally in previous seasons. Not only was insufficient chilling received during the 1988-89 dormant season, higher temperatures occurred than in previous years to provide further negative effects. Floral bud abortion had occurred and various stages of terminal dieback were evident by April 13 on

the 17 cultivars.

A study was undertaken to determine if treatments of hydrogen cyanamide applied after the time of normal bud break would induce the buds to break and thus salvage the trees for future fruiting. Treatments were applied April 13 and consisted of 0, 1, and 2 percent Dormex® (hydrogen cyanamide) plus 0.25 percent X-77 surfactant.

Dormex treatments resulted in more buds breaking and maturing on last year's growth, more terminal buds breaking, and less shoot dieback than on the

Effect of Dormex Treatments on Bud Break of Peaches and Nectarines Following Insufficient Chilling, 1989

Cultivar	Chilling requirement Hours	Bud break, by Dormex rate		
		0% Pct.	1% Pct.	2% Pct.
<b>Peach</b>				
BY78-289 .....	?	28	45	79
Goldilocks .....	750	0	10	36
La Premier .....	1,050	17	33	67
La White .....	650	13	61	87
Loring .....	750	14	46	70
Redskin .....	750	17	70	63
Sun Prince .....	800	19	66	77
White Hale .....	750	16	41	64
Wild Rose .....	750	10	29	49
Winblo .....	850	10	30	66
<b>Nectarine</b>				
Summer Beaut ....	750	16	46	73
Early Bird .....	750	12	47	85
Carolina Red .....	750	25	68	80
Crimson Gold .....	750	15	46	74
Durbin .....	850	7	25	57
Red Gold .....	850	24	39	86
Sun Glo .....	850	27	54	77
Average .....		16	45	71

untreated portions of the trees. However, in each case the 2 percent  
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**Dormex, continued**

rate was more effective than the 1 percent rate of Dormex. New growth arising from the Dormex-treated shoots was more vigorous than growth from the untreated shoots.

Goldilocks was the only cultivar that lost major scaffold limbs. How-

ever, much of the previous season's growth died on the untreated portion of trees of all cultivars. This dieback, coupled with reduced bud break and vigor, could reduce the following year's fruiting potential.

Though the 1989 crop was lost due to flower bud abortion which occurred

before treatment, the Dormex-treated portion of the trees did not experience a reduction in fruiting potential for the next season's crop due to the enhanced vegetative growth.

**W.A. Dozier, Jr., A.A. Powell, A.W. Caylor,  
W.R. McDaniel, and E.M. Carden**

## **Broiler Litter Fertilizer for Tomatoes Boosts Yield, Advances Harvest**

Results of recent Alabama Agricultural Experiment Station research indicate that poultry litter is an ideal fertilizer for vegetable crops. Application of 10 tons per acre of poultry litter produced about 11,629 pounds per acre more tomatoes than from using commercial fertilizer. And the broiler litter treatment speeded maturity for earlier harvest.

The objectives of the study at the Sand Mountain Substation, Crossville, were to determine the effects of two poultry litter rates, compared to commercial fertilizers, on tomato growth and yield. The tests were done on Wynnville sandy loam soil, using Mountain Pride tomatoes (transplants) spaced 15 inches apart in 5-foot rows.

Poultry litter rates of 10 and 20 tons per acre were applied in the fall. The commercial fertilizer treatment consisted of 400 pounds per acre of 13-13-13 (according to soil test recommendations) applied in the spring. Nitrogen sidedressing consisted of 68 pounds of N per acre.

Yields of both large (5x6) and medium (6x6) packs were increased by the 10-ton-per-acre rate of litter: large—5,838 pounds with commercial fertilizer and 11,376 pounds with broiler litter; medium—17,220 pounds with commercial fertilizer and 22,428 pounds with broiler litter. Application of 20 tons per acre resulted in

similar yields.

These data show that broiler litter enhanced tomato yield by about 20 percent compared to standard commercial fertilization practices. In addition, earlier harvest occurred when broiler litter was used.

**J.E. Brown, D.W. Porch, C.H. Gilliam,  
R.L. Shumack, and J.T. Eason**

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