TO: County Agents

Many of you attended Field Days last spring to observe vegetable research in progress. At that time most of the research was not completed and results could not be given. We plan to briefly summarize the results of research in vegetables for the 1959-60 season and forward it to you through our "Vegetarian" newsletter.

This letter covers research work conducted on vegetables at the Potato Investigations Laboratory at Hastings and the Watermelon and Grape Investigations Laboratory at Leesburg, Florida. Our thanks go to Dr. Eddins and Dr. Crall for their splendid cooperation.

LEESBURG STATION (1959-60 SEASON)

I - Investigations of and Control of Fusarium Wilt of Watermelon

Four selections (F59-1, F59-2, F59-3 and F59-4) of a wilt-resistant Garrison-type watermelon were tested in replicated trials with Charleston Gray, Summit, Garrisonian and USDA Line 59-7. Selections F59-3 and F59-4 were comparable with Summit which is highly resistant to wilt. Selections F59-1 and F59-2 were intermediate between Charleston Gray which is moderately resistant to wilt and Garrisonian, a highly susceptible variety. Yields of all selections were equal to and mature later than Charleston Gray. Fruit quality in each selection was excellent.

II - Investigations of and Control of Fungus Diseases

A. Control of Gummy Stem Blight
   1. Spraying or drenching watermelon seed with several rates of fungicides (phalan, maneb, omadine and zineb) at various stages during the seed cleaning process failed to completely disinfect the seed of the gummy stem fungus.
   2. Early fungicidal sprays - In three greenhouse tests fungicidal sprays on newly emerged seedlings from commercial seed prevented natural infection of the cotyledons by gummy stem.

B. Fusarium Wilt
   Wilt in 1960 was slight. Results of 1959 tests showed fusarium wilt developing in each variety as follows:
   Florida Giant (77%), Garrisonian (59%), Blackstone (17%), Congo (15%) and others less than 10% each.

III - Pollination of Watermelons by Honeybees

Fruit set and yields after 8 or more bee visits per flower were significantly better than after 4 or less visits. No melons were set where no bee visits were permitted. Fruit set and yield after hand pollination were comparable to those after open pollination.

Percentage of fruit set was directly correlated with ovary length (measured on the morning of flower opening). No fruit set on ovaries under 17 mm. long, 5% on ovaries under 20 mm., 38% on ovaries 20 mm. or over, and 93% on ovaries 28 mm. or over (using Charleston Gray variety).
Bee activity ordinarily began around 6:30 A.M., was most intensive from 7 to 10:00 A.M., and diminished thereafter until blossoms closed around noon. The average duration of each bee visit was about 6 seconds. The lowest rate of bee visitation observed was 7.3 visits per flower per hour.

IV - Fungicidal Control of Watermelon Foliage Diseases

In a comparison of 7 fungicidal spray treatments, maneb, phalan, captan 80W, and zineb plus maneb were superior in their control of gummy stem blight. There was a yellowing and burning on the leaves and exposed fruits after the seventh application of phalan, as in 1959, and a yellowing and hardening of the edges of the older leaves following the last application of maneb. There were no significant differences in early and total yields among the treatments primarily because watermelon diseases were of relatively minor importance in 1960.

V - Testing and Evaluating Insecticide for Watermelons

An experiment designed to evaluate chemical control of leafminer on watermelon included the following spray treatments (listed in order of their effectiveness): dibrom E (not approved) 16 ounces (actual toxicant per 100 gallons); parathion W, 4.8 ounces; diazinon W, 4 ounces; parathion W, 2.4 ounces; diazinon W plus maneb W, 4 ounces plus 19.2 ounces; demeton E, 6 ounces; trithion W, 4 ounces; phosphamidon E (not approved) 6 ounces; untreated check. Dibrom, parathion at both rates, diazinon and diazinon plus maneb were all significantly better than the check (5 percent level). None of the materials were effective 6 days after application.

Thimet (not approved) 8 percent granular at 1.8, 3.6 and 5.4 grams per hill and di syston (not approved) 5 percent granular at 2.4, 4.8 and 7.2 grams per hill, applied post-emergence on the soil, were not effective in leafminer control.

VI - Variety Trials

A. Watermelons:

Charleston Gray and Indiana 133, a line selected from Charleston Gray for increased wilt resistance, were the outstanding long-melon-type varieties in this trial. USDA lines 59-6 and 59-7 and Tri-X 313 were the most promising round-melon-type varieties tested. Although not highly resistant to Fusarium wilt, both 59-7 and Tri-X 313 appear promising enough to warrant grower trials.

In a replicated test with 8 entries, USDA 59-7 was very early in maturity, Charleston Gray and Summit early and all other entries somewhat later maturing. Yields of Summit, Charleston Gray and the 4 Florida lines were comparable, but USDA 59-7 and Garrisonian produced significantly lower yields.

B. Cantaloupes:

Most promising lines (of 8 entries) were Delta Gold, Seminole, and Rio Gold. All of these compared favorably with Hale’s Best Jumbo and PMR-45 in quality. All entries were superior to Jumbo and PMR-45 in resistance to leafspots.

VII - Miscellaneous Research

A. Spreader-sticker test:

There were only slight differences among additives in the total amount of fungicide deposited on the foliage immediately after application. After 1.25 inches of rainfall, 80% or more of the fungicide on the upper surface and 20% on the lower surface were lost. Loss of fungicide after slight amounts of rain (0.10 inches), particularly from the upper surfaces of leaves, was greatest after treatments with good wetting characteristics.
B. Soil Fumigation:  
Eleven chemical treatments were compared for their control of soil fungi and rootknot nematodes associated with the culture of watermelons on old land. All materials were applied both as broadcast (entire area) and band treatments. 
The movement of soil from one plot to another by high winds and washing rains and spotty infestations of both the Fusarium wilt organism and rootknot nematode resulted in extreme sampling variations so that differences in stands or yields between treatments were not significant and no treatments were effective in reducing rootknot galling or losses from Fusarium wilt.

C. Factors Affecting Gourdnecking in Watermelon:  
Plants of the variety Fairfax were grown under the four possible combinations of conditions of high and low levels of soil fertility and soil moisture. Fruits were harvested as soon as their final shape with regard to gourdnecking could be determined. Approximately 11 percent of all fruits developed gourdnecks, but the amount of gourdnecking was not affected by soil fertility and soil moisture levels.

D. Cultural Practices Affecting Watermelon Maturity:  
In a field trial to determine the effects of various cultural practices on hastening maturity of watermelon, more vigorous early season growth and increased yields of early melons resulted both from the use of a clear polyethylene plastic cover over the bedded area and from sloping the beds (30° slope to south). Total yields also were larger from covered beds. Early season soil temperatures were higher under plastic covers and in sloped beds, but factors such as better moisture and fertilizer retention under the plastic covers were believed to be also partially responsible for the better early season growth of watermelon plants. The effects of planting date and transplanting on earliness were not decisive this season.

HASTINGS STATION (1959-60 SEASON)

I. Investigation of Factors Affecting Potato Production on Old Land

A. Cover Crops:  
In an investigation of seven different summer cover crops, highest yields of potatoes were obtained following corn or crabgrass, which has also been true in previous years. The percent organic matter in soil following corn was 1.53 and in fallow plots 1.26.

B. Rotations:  
Yields of potatoes following one winter crop of rye or oats were increased 20 percent compared to continuous potatoes.

C. Phosphorus:  
On old land, higher potato yields were obtained by using the conventional 200 pounds of P\textsubscript{2}O\textsubscript{5} per acre rather than higher or lower rates. On new land, which contained 16 pounds of exchangeable P\textsubscript{2}O\textsubscript{5} per acre before fertilization, potato yields increased as the amount of applied P\textsubscript{2}O\textsubscript{5} increased. Specific gravity of tubers was inversely related to amounts of applied P\textsubscript{2}O\textsubscript{5}, ranging from 1.0755 to 1.702 for 50 and 400 pounds P\textsubscript{2}O\textsubscript{5} treatments, respectively.

D. Magnesium:  
When potatoes were fertilized with 0, 25, 50, 100 and 200 pounds per acre of MgO on both new and old land, the only significant yield difference occurred between the 25 and 200 pound rates on old land, the latter rate producing lower yields.
E. Source of Potash:
Higher yields of potatoes were obtained by using fertilizer containing all muriate rather than all sulfate as the source of potash; by using 200 pounds per acre of potash rather than 100 or 300 pounds; and, by using broadcast method of application rather than band application.

F. Sidedressing Materials:
Fertilizer containing both ammonical and nitrate sources of nitrogen increased potato yields more than those containing only nitrate. Foliar sprays of 10-20-10 reduced potato yields.

G. Sawdust:
Second year differences in potato yields due to sawdust treatments were similar to first year's results. Yields of 122, 138, and 159 hundred-pounds of size A potato tubers per acre were obtained from 0, 10 and 40 tons of sawdust per acre, respectively. One-hundred pounds per acre of supplemental nitrogen from ammonium nitrate before planting increased yields to 127, 151 and 166 hundred-pounds per acre in the 0, 10 and 40 ton of sawdust treatments, respectively. Soil volume weight measurements of 1.2, 1.1 and 1.0 were obtained in the 0, 10 and 40 ton rates.

II - Variety Trials
A. Potatoes:
None of 26 varieties and 23 USDA seedling selections excelled Sebago, the standard variety, in chipping and market qualities of tubers. Two white varieties, Pungo and Plymouth and three red varieties, Red Lnsoda, Redskin (all suggested for trial planting) and Red Pontiac (recommended) produced greater yields than Sebago although differences were not statistically significant.

B. Cabbage:
Emerald, a new early variety, again produced a high yield and appeared suitable for commercial trials. Glory of Enkhuizen, Greenback, Early Glory and Marion Market were the outstanding midseason varieties in yield and market qualities.

C. Cauliflower:
Snowball Imperial and Snowdrift excelled other varieties in yield and quality of flower.

III - Fertilizer Requirements of Cabbage

Results of liming studies suggested that pH of 5.7 to 6.0 is preferred for cabbage. In a dry season 24 lbs. of nitrate N as sidedressing produced maximum yields following a basic application of 1600 pounds of 7-9-9 fertilizer. In three wet seasons two to three sidedressings with 24 lbs. of nitrate N per application per acre produced maximum yields with the same amount of fertilizer at transplanting. Sidedressings were made 23, 66 and 96 days after transplanting.

IV - Testing and Evaluating Insecticides
A. Cabbage:
Of thirteen insecticides applied every two weeks to cabbage the following gave best control at the indicated actual toxicant per acre:
1. Cabbage looper - Parathon 4 oz.; endrin 3.2 oz.; guthion 8 oz.; methyl trihion 8 oz. (not approved); diazonin 4 oz.; dibrom at 16 oz.; and systox 6 oz.
2. Cabbage aphid - Phosdrin 4 oz.; phosphamidon 8 oz. (not approved); and dibrom 16 oz.
3. Green peach aphid - Thiodan 8 oz.; phosdrin 4 oz.; and endrin 3.2 oz.
B. Potatoes:
1. Southern potato wireworm - Parathion 1 lb.; diazinon 2 lbs. and thimet 1 lb. per acre prior to planting.
2. Green peach aphid - Dimethoate 6 oz. (not approved); endrin 3.2 oz.; syston 6 oz.; thimet 8 oz.; and thiodan 8 oz. actual toxicant per acre.

V - Gibberellins

Spraying cabbage plants with 25 ppm gibberellic acid 47 days after transplanting had no significant effect on yield.

VI - Resistance to Corky Ringspot of Potatoes

On the named varieties planted in soil infected with corky ringspot virus, Red Pontiac, Sebago and White Rose showed from 29 to 72% susceptibility to the disease. Pungo and Plymouth (both suggested for trial plantings) and Delus, Merrimack and Saco were immune.

VII - Chemical Weed Control

A. Potatoes:
DNBP at 3 and 1.5 lbs. in 100 gallons of water per acre applied before potatoes emerged reduced weeds by 50%. CDEC applied 4 and 2 lbs. gave 35% control, while CDAA at 4 lbs. gave 12% control.

B. Cabbage:
CDEC and CDAA were applied singly and in combination to transplanted cabbage. Weed populations were too low for good results. CDEC at 4 lbs. per acre did not affect yield of cabbage. Some of the other treatments resulted in reduced yields.

VIII - Miscellaneous Studies

A. Source of Potash and Method of Fertilizer Application for Cabbage:
Density of cabbage heads and yields were not affected by using muriate and sulfate sources of potash in 6-8-8 fertilizer applied in bands and broadcast and by varying the amount of potash in the fertilizer.

B. Effects of Seed and Fertilizer Rates on Yields of Potatoes:
In recently-cleared new land, potato seeding rates were varied from 1,500 to 3,500 pounds of two-ounce cut seed per acre and the fertilizer used ranged from 1,200 to 4,200 pounds per acre. The highest and most profitable yield, 250 hundred pounds sizes A and B tubers per acre, was produced with 3,000 pounds of seed and 3,600 pounds of fertilizer per acre.

C. Efficacy of Sulfur-limestone Soil Treatment for Control of Corky Ringspot of Potatoes:
No information was obtained on the value of the sulfur-limestone treatment for control of corky ringspot as only a trace of the disease was present. Difference in yields of potatoes grown in the treated and nontreated soil were not significant.

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