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VEGETABLE CULTIVAR SCREENING TRIALS 1970 - 1971, A PROGRESS REPORT

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Cultivar selection is the most promising means of rapidly improving yields and quality of vegetables grown in the Caribbean. In Barbados during 1970-1971 a large number of cultivars of onions, carrots, cabbage, snap beans, beetroot, lettuce and radish were screened as part of the joint Ministry of Agriculture, O.A.S. Vegetable Research and Development Programme. Certain cultivars were selected for further trials in larger plots under semi-commercial conditions, and the most outstanding ones will be finally stocked by the Ministry of Agriculture seed store. Only initial screening trials are described in this paper since the final selections from second stage trials are not yet complete.

In the preliminary screening trials cultivars were evaluated chiefly on physical characteristics, though in some cases yield was also determined. Many of the trials will be repeated at different times of the year so that seasonal effects may be examined.

Onions:

Two trials were carried out; the first was planted on 11th - 12th June 1970 and the second on 7th - 8th January 1971.

The following cultivars were used:

Dessert Seed Co: Granex, Henry's Special, Dessex, Early Premium, Golden, Y 28, Early Harvest, Spano, White Alamo Hybrid, Robust, Majesty, Peerless, Red Granex, Tropicana, Early Grano, Early Top, Texas Early Grano 502, San Joaquin Excel 986, Yellow Creole, Yellow Bermuda, Stockton Yellow Globe, Imperial 48, Early Crystal 281, White Mexican, White Creole, White Queen, Red Creole C5, Burgundy, Calred, California Early Red, Red Grano, Colorado #6, Dehydrator #3, Dehydrator #4, Dehydrator #6, Dehydrator #8.

Niagara Seed Company: Early Texas White Grano, Excel 986 Yellow, Red Creole C5, Granex Yellow Hybrid.

Keystone Seed Company: Crystal Wax, Excel 986, Red Creole C5, Texas Early Grano 502, Fiesta, Granex Yellow PRR F1 Hybrid, Sweet Spanish Utah Jumbo Yellow.

A randomized block design with three replications was used and the plot size was 192 sq. ft.

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The cultivars were evaluated on 21st August when most of the "pickling" types were maturing, and again for the remaining cultivars at the end of September. Characteristics assessed were shoot and bulb development, bulb size, shape and colour and average weight of bulbs.

It was decided that all cultivars would be tried again at different times of the year because of the effects of daylength and temperature on bulb formation. The best selections from this trial were:

Best full size Yellow: Granex Yellow PRR F1 Hybrid (Keystone), Granex Yellow Hybrid (Niagara), Granex (Dessert), San Joaquin (Dessert), Early Top (Dessert).

Best full size Red: Red Granex (Dessert), Burgundy (Dessert).

Best full size White: Early Texas White Grano (Niagara)

Best yellow pickling size: Y 28 (Dessert), Golden (Dessert).

Best white pickling size: White Queen (Dessert), White Creole (Dessert).

In the second screening trial, planted in January, the same full size yellow cultivars were selected with Texas Early Grano (3, 5) and Dessex (3) as additions. Four Japanese hybrids from the Takii Seed Company, Dragon Eye, Express Yellow, Trial No. 5 and Keep Well were included in this trial. These started to bulb much later than Granex (3) and at the present time are not sufficiently developed to evaluate.

During 1970-1971, Granex Yellow PRR F1 Hybrid (5), and Yellow Granex F1 Hybrid (3) were the main cultivars used in the 153 acres of onions planted during September to November. Although the yields are excellent, skin retention is very poor and it crushes easily on pallets during shipment. Losses due to reshooting during storage have also been a problem. It is now planned to compare Dessex, Early Top and San Joaquin with Granex in commercial trials. Dessex forms smaller bulbs than Granex when planted in June or January but may be suitable for early planting in September. It may have better skin retention and seems to be more uniform with less loss through thick necks. Early Top and San Joaquin are similar in appearance and shape to Texas Early Grano but plant to plant uniformity is better. Crushability, storage characteristics and disease resistance will be considered in the second stage trials.

Excellent pickling cultivars are now available as a result of these trials, and June seems a favourable month for planting; bulbs are mature within eight weeks.

Carrots:

This trial was planted on 25 th June 1970. Planting at this time of the year does not give the quality and yield of carrots which can be expected from September to January plantings and the characteristics of cultivars may vary with season. It will therefore be necessary to repeat this trial at different times of the year.

The following cultivars were used:

Burpee Seed Company: Popsicle

Asgrow Seed Company: Highlight

Dessert Seed Company: Hybrid F1 Gold, Hybrid F1 Emperor 286, Hybrid F1 Chantenay 9532, Wisconsin #5, Hybrid F1 Early Cross.

Vaughan Seed Company: Sweethear

Sutton & Sons: Champion Scarlet Horn, Early Gem, Concord, Favourite, New Red Intermediate.

Northrup King Seed Company: Pacesetter, Danvers Half Long Red Cored, Touchon.

Ferry Norse Seed Company: Gold Pak, Chantenay Red

Ohlsens Enke: Nantes Empire Osen, Amsterdam 378 Osen, Nantes Express Osen, Amager Osen, Flakkeer Giant, Autumn Giant, Berlicum, Fancy Osen Novelty, James Scarlet Intermediate, London Market, Nantes Ny Munkegaard 11 Osen, Paris Market, Red Giant, Red Winter, St. Valery, Nantes No. 1003, Scarlet Horn, Regal Osen.

Niagara Seed Company: Industry, Nantes, Scarlet St Sr.

Keystone Seed Company: Chantenay Red Core No. 5, Chantenay Long No. 403, Chantenay Royal No. 13, Danvers 126, Eureka, Gold Pak 61, Imperator 58, Imperator Extra Long, Nugget, Touchon, Waltham Hicolor, Touchon.

A randomized Block design with 3 replications was used, and the plot size was 50 sq. ft.

The cultivars were evaluated at harvest at the end of October (four months after planting). Characteristics assessed were length, shape and colour, flavour and internal characteristics of the tissues, condition of the crown, plant to plant variability, susceptibility to infield rotting, and yield.

The best cultivars from June planting were: Chantenay Red Core No. 5 (Keystone), Favourite (Suttons), Danvers Half Long Red Cored (Northrup Ring), Concord (Suttons), Early Gem (Suttons).

Due to late delivery of seed, it was not possible to include Japanese cultivars from the Takii Seed Company. These will be included in future trials.

The same cultivars obtained from different seed companies varied considerably and it may prove necessary to examine in more detail strains within cultivars.

All the above cultivars were medium long types with the exception of Early Gem which is a stump rooted type. Since the stump rooted cultivars are better suited to mechanical harvesting, it would be more convenient to grow them, provided that they are acceptable to the consumer.

To grow the long rooted carrots, special attention must be given to deep cultivations. The length of medium long carrots also is greatly improved by deep tillage.

Cabbage:

Seedlings were raised in boxes from 27th August sowing, and were transplanted in the field on 19th October 1970.

The following cultivars were used:

Asgrow Seed Company: Copenhagen Market, Headstart, Savoy Perfection Frumhead.

Ferry Morse Seed Company: Dutchman, Great Dane Y.R., Headmaster, King Cole, Little Rock, Roundup, Superette, Resistant Golden Acre, Bonanza, Ferry's Round Dutch, Globelle TBR, Ferry's Hollander, Oakview Ballhead, Wisconsin Ballhead Improved, Savoy Chieftain.

Burpee Seed Company: Earliana, Emerald Cross Hybrid, All Head Early Burpee, O-S Cross, Succession.

Vaughan's Seed Company: C-C Cross, Stonehead Hybrid, Harvester Queen.

Northrup King Seed Company: American Drumhead Savoy, Hollander Short Stem.

Sutton & Sons: May express, Earliest, Favourite, Pride of the Market, April, Harbinger, Flower of Spring, Imperial.

Dessert Seed Company: Hybrid F1 Early Cross, Hybrid F1 Early Shipper, Dessert's 126, Green Acre, Badger Belle.

Niagara Seed Company: Badger Market Y.R., Copenhagen Market Early, Jersey Queen Y.R., Jersey Wakefield Early, Louisiana All Year, Brunswick, Penn State Ballhead, Wisconsin Golden Acre.

Keystone Seed Company: Badger Ballhead, Charleston Wakefield, Copenhagen Market #53, Dark Green Savoy, Early Glory, Early Round Dutch, Globe 62 MYR, Glory of Enkhuizen, Golden Acre, Greenback YR, Wisconsin Golden Acre, Marion Market YR, Premium Late Flat Dutch, Ventura, Stein's Flat Dutch, Wisconsin Hollander #8 YR.

Takii Seed Company: C-M Cross, C-G Cross, Express 50, C-0 Cross 69, C-M Cross 70, K-K Cross, Express Cross 60.

A randomized Block design with 3 replications was used, and the plot size was 50 sq. ft.

The cultivars were evaluated on 15th December 1970, two months after transplanting and 3 1/2 months after sowing. Characteristics judged were size, colour, shape and compactness of head, plant to plant variability and characteristics of wrapper leaves.

The following cultivars were outstanding: Emerald Cross Hybrid (Burpee), Stonehead Hybrid (Vaughan), Express Cross 50 (Takii), C-O Cross 69 (Takii), C-M Cross 70 (Takii), K-K- Cross (Takii), Express Cross 60 (Takii).

K-K Cross is also sold as Summer Stride, and C-M Cross as Emerald Cross Hybrid. In commercial plantings K-G Cross (Summer Pride) has also given good results.

Many of the cultivars which were not hybrids, were very variable. Bursting of the heads was also a problem, e.g. Early Jersey Wakefield. Size and shape of head varied considerably between the different hybrids and further trials are necessary to assess yield, market acceptability, disease resistance and ability to store.

Introduction of some of the above cultivars through the Ministry Seedstore should greatly improve the quality of cabbage sold in Barbados.

Snap Beans:

This trial was planted on 4th and 5th November 1970. The following cultivars were used:

Ferry Morse Seed Company: Burpee's Improved Bush, Fordhook Bush 242, Henderson's Bush, Jackson Wonder Bush, Thorogreen Early, Avalanche, Broad Improved Long Pod, Bush Romano 14, Green Lakes 5A, Processor, Tenderette, Fordhook Conc. 242.

Keystone Seed Company: Bountiful, Bush Blue Lake 274, Cascada, Catskill RB 4, Commodor Improved, Contender, Corneli 14, Earliwax, Extender, Gallatin 50, Harvester, Mountaineer, Olympia, Provider, Resistant Cherokee Wax, Resistant Kingshorn Wax, Slenderwhite, Slimgreen, Taylor Horticultural, Tendercrop, Tenderwhite, Tennessee Green Pod, Top Crop, Blue Lake, All Green, Burpee Improved Bush, Dixie Butterpea White, Fordhook 242, Henderson, Jackson Wonder.

Burpee Seed Company: Baby Fordhook.

Sutton & Sons: The Prince, Masterpiece, Selected Canadian Wonder, Phoenix Claudia.

Vaughan's Seed Company: Landreth Stringless Green Pod.

A randomized block design with three replications was used. The plot size was 75 sq. ft.

The cultivars matured at different times and harvest was carried out over the period from 28th December 1970 to 11th January 1971. Since the cultivars are being tested for suitability to mechanical harvest, each plot was harvested only once.

Records were made of type, straightness, length, stringiness of pod, habit of plant, height at which pods are borne, uniformity of maturity and yield. Uniformity of maturity is of obvious importance if once over mechanical harvesting is to be carried out.

In general, the highest yielding cultivars were also found to be best as regards physical characteristics. The best green, round podded cultivar was Green Lakes 5A, the best green flat podded cultivar was The Prince and the best wax round podded cultivar was Earliwax.

The wax types will be omitted from future trials because of their poor market potential. The following 27 cultivars which yielded over the equivalent of 3,500 lbs./acre will be given further trial: Green Lakes 5A, Olympia, Top Crop, Corneli 14, Catskill RB4, The Prince, Provider, Contender, Bush Blue Lake 274, Avalanche, Slenderwhite, Extender, Cascade, Commodore Improved, Bountiful, Gallatin 50, Bush Romano 14, Processor, Mountaineer, Sutton's Selected Canadian Wonder, Tenderwhite, Tendercrop, Landreth Stringless Green Pod, Tenderette, Phoenix Claudia, Sutton's Masterpiece.

The cultivar Taylor Horticultural appears promising as a dry seed type and will be tried again.

Lettuce:

Three trials were carried out. The first was planted on 20th May 1970. This trial was direct seeded with a Stanhay Precision Planter but had to be abandoned because only very few of the seeds germinated. It is believed that this was due to dormancy in the lettuce seed induced by the high temperatures in the field. Good germination was achieved in subsequent sowings in seedboxes using the same batch of seed.

The cultivars used were:

Ferry Morse Seed Company: Great Lakes 54, Great Lakes 366, Great Lakes 6238, Green Bay 14731, Greenland.

Dessert Seed Company: Great Lakes 407, Great Lakes 659-G, Great Lakes 660, Great Lakes 101-G.

Niagara Seed Company: Golden State D, Great Lakes Standard, Great Lakes 65, Great Lakes 66, Great Lakes Shipper 212, Great Lakes Mesa 659, Great Lakes 659 MI, Great Lakes 6238, Vanguard MI, New York #12, Bellaverde.

Keystone Seed Company: Bellaverde MC, Calmar MC, Climax MC, Climax 84 MC, Great Lakes R 200-95 MC, Great Lakes 118 MC, Great Lakes 659 MC, Iceberg, Minetto MC, Primavera MC, Vanguard MC.

Standard Variety sold at Min. of Agric. Seedstore: Mignonette Bronze.

In the second trial, the seed was sown in seedboxes on 10th June 1970, and the seedlings were transplanted on 3rd of July.

A randomized Block design with three replications was used. Plot size was 50 sq. ft. The trial was inspected on 19th August 1970.

A third trial was carried out in November 1970, using a similar experimental design and plot size to that used in the second trial. The cultivars were evaluated on 5th January 1971. In both trials the cultivars were evaluated on size and compactness of head, texture, taste and degree of bolting.

At present only Minetto and Mignonette Bronze can be recommended for commercial use. However, the following cultivars gave indications of heading and it is felt that better results may be obtained with these cultivars at higher elevations.

Greenbay 14731, Great Lakes 65, Great Lakes Mesa 659, Great Lakes 6238, Belleverde MC, Iceberg, Great Lakes 659 MI, Bellaverde, Great Lakes R 200-95 MC, Vanguard MC.

Red Beet:

Two trials were carried out, the first being planted on 12th and 13th May 1970 and the second on 23rd June 1970.

The cultivars used were:

Asgrow Seed Company: Asgrow Wonder, Redpack

Ferry Morse Seed Company: Detroit Dark Red, Morse's Strain, Firechief.

Burpee Seed Company: Improved Blood, Extra Early, Red Ball.

Vaughan's Seed Company: Winterkeeper.

Ohlsens Enke Seed Company: Crimson Globe, Cylindra 504, Osen, Cylindra 0176 Osen, Cylindra 0303 Osen, Improved Original, Fireball, Sigma Osen.

Northrup King Seed Company: Early Wonder Stays Green, King Red, Mono King Explorer, Royal Red, Special Crosby.

Sutton & Sons: Early Bunch, Globe.

Dessert Seed Company: Hybrid Fl Pacemaker.

Niagara Seed Company: Early Wonder Improved, Detroit Medium Top, Detroit Dark Red, Short Top, Early Wonder, Tall Top.

Keystone Seed Company: Detroit Dark Red, Detroit Dark Red, Medium Top, Detroit Dark Red, Canner Strain, Detroit #12, Detroit Perfected, Early Wonder, Ruby Queen.

A randomized block design with 3 replications was used. Plot size was 50 sq. ft. The first trial was evaluated and the second was harvested on 10th September 1970.

The cultivars were judged on shape, size, skin texture, size of top and tissue colour. The most promising cultivar selected from both trials was Hybrid Fl Pacemaker. This cultivar as well as the following 9 cultivars will be tested in semi-commercial sized plots in the near future: Redpack, Firechief, King Red, Ruby Queen, Royal Red, Detroit Dark Red, Detroit Perfected, Mono King Explorer, Special Crosby.

Radish:

This trial was planted on 2nd February 1971. The cultivars were grouped as follows: Red rooted cultivars, Red and White rooted cultivars, and White rooted cultivars.

The Red rooted cultivars were as follows:

Ferry Morse Seed Company: Cincinnati Market, Red Devil.

Ohlsens Enke Seed Company: Non Plus Ultra, Long Red, Round Red Winter, Saxa 455 Extra Short Top Osen, Wurzburg.

Northrup King Seed Company: Firecracker, Stoplite.

Dessert Seed Company: Mexican Bartender, Red Boy, Rojo Grande.

Asgrow Seed Company: Globe Master.

Keystone Seed Company: Champion, Cherry Belle, Chinese Rose Winter, Comet, Red Prince, Scarlet Globe, Medium Top.

Burpee Seed Company: Burpee's Earliest Scarlet Button, Rapid Red, Red Giant, Scarlet Globe.

Vaughan's Seed Company: Cavalier.

The Red and White rooted cultivars were:

Ohlsens Enke Seed Company: Gaudry, Pernot, Rovi Osen Novelty, Scarlet Gem.

Keystone Seed Company: French Breakfast, Long Brightest Scarlet, Sparkler.

The White rooted cultivars were:

Ohlsens Enke Seed Company: Sezanne

Northrup King Seed Company: Giant White Globe.

Keystone Seed Company: California Mammoth White, Icicle.

Burpee Seed Company: Burpee White, White Straasburg.

A randomized block design with three replications was used. Plot size was 50 sq. ft. The trial was harvested on 3rd March 1971.

The characters which were used to evaluate the cultivars were shape, size of root, colour and size of top. The best of the red and white rooted cultivars was Gaudry. Rovi Osena Novelty was promising and is very early maturing. Of the red rooted cultivars, Champion was found to be excellent. Other cultivars selected for re-trial are: Comet, Burpee's Earliest Scarlet Button, Red Devil, Non Plus Ultra, Wurzburg, Round Red Winter, Burpee's Rapid Red, Stop Lite, Saxa 455 Extra Short Top Osena, Red Prince.

CONCLUSIONS

In all the crops examined, with the possible exception of onions and beans, cultivars which are better than those currently used have been found. To keep up to date with cultivar improvement, it will be necessary to examine new cultivars as they come on the market each year. This has to be done systematically as it was not generally found possible to select the best cultivars for Barbados merely by consulting catalogue descriptions. Ultimately it may be profitable to carry out more breeding work for certain crops within the Caribbean area, paying particular attention to such characteristics as high temperature tolerance, disease resistance and day-length requirement.

SUMMARY

During 1970-1971 a large number of cultivars of the following vegetables was screened: onions, carrots, cabbage, snap beans, beetroot and lettuce. The following cultivars were selected for further trial:

Onions: (selected from 54 cultivars) Granex F1 Hybrid (different strains), San Joaquín, Dessex, Early Top for June planting; Granex F1 Hybrid, Texas Early Grano (various strains), Early Top, San Joaquín, Dessex for October to January planting.

Carrots: (selected from 50 cultivars) Chantenay Red Core #5 (Keystone), Sutton's Favourite, Danvers Half Long Red Cored, (Northrup King), Sutton's Concord, Sutton's Early Gem, Hybrid F1 Gold (Dessert), Japanese Hybrids for June, July planting.

Cabbage: (selected from 72 cultivars) Express Cross 50, Express Cross 60, Summer Stride, Summer Pride, C-0 Cross 69, C-M Cross 70, Stonehead Hybrid, Emerald Cross Hybrid (Burpee).

Snap Beans: (selected from 34 cultivars) 28 cultivars which yielded more than the equivalent of 3,000 lbs/acre will be re-tested.

Beetroot: (selected from 34 cultivars) Hybrid F1 Pacemaker, Redpack, Firechief, King Red, Ruby Queen, Royal Red, Detroit Dark Red, Detroit Perfected, Mono King Explorer, Special Crosby.

Lettuce: (selected from 32 cultivars) Minetto, which was the most promising although the heads were small. None of the Great Lakes selections gave hard heads when planted in either June or October. At a cooler site the following cultivars will be re-tested: Greenbay 1473, Great Lakes 65, Great Lakes Mesa 659, Great Lakes 6238, Bellaverde, Bellaverde MC, Great Lakes R 200-95 MC, Iceberg, Vanguard MC.

Radish: (selected from 37 cultivars) Champion and Red Prince most promising. 13 cultivars selected for re-trial.