

Strawberry Improvement Program in Poland¹

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Abstract

Two cultivars of strawberry, 'Dukat' and 'Paula' have been developed in Poland to extend the processing season. Both ripen before 'Senga Sengana' and are resistant to *Botrytis*. 'Dukat' ripens 3 days before 'Senga Sengana' and is equal or superior in productivity. 'Paula' ripens a week earlier than 'Senga Sengana,' but has slightly lower fruit quality and yield.

Introduction

Poland ranks third world-wide in the production of strawberries. The productivity and quality of 'Senga Sengana' has been a major influence in the development of the strawberry processing industry for export purposes. However, the widespread planting of a single cultivar overloads the processing plants during the harvest season. Furthermore, the softness of 'Senga Sengana' fruit makes it susceptible to the rotting pathogen, *Botrytis* which also limits the storage life of the fruit. Lengthening the harvest season would make more efficient use of the processing plants and controlling *Botrytis* rot would minimize losses due to spoilage.

Strawberry Breeding Programs

Three promising cultivars have been developed by Polish strawberry breeders. Two of these, 'Dukat' and 'Paula,' are in the final stages of evaluation and will be released to the growers(2). The third, 'Sin 72,' is in the initial stages of evaluation. 'Dukat' was bred by Dr. E. Zurowicz of the Skierniewice Station. It was selected from a population of 200 seedlings from the cross, 'Karolowa' x 'Gorella.' 'Karolowa' is an old Ukrainian cultivar and 'Gorella' was introduced from the

Netherlands. 'Dukat' has excellent color, good flavor, and is productive. It has good size, and possesses a tough skin which enhances its resistance to *Botrytis*. 'Dukat' ripens 3 days earlier than 'Senga Sengana' and its entire crop can be harvested in five pickings. This is in contrast with the usual seven pickings required for 'Senga Sengana.'

The second cultivar, 'Paula,' was developed by Jerzy Hortynski of the Department of Genetics and Plant Breeding of the Agricultural Academy in Lublin. 'Paula' was selected from a seedling population of 300 from the cross, 'Senga Tigaja' (German) x 'Merton Dawn' (English). Fruit on 'Paula' has firm flesh which holds up better in shipping than 'Senga Sengana' and resists *Botrytis* (H. Borecka, personal communication, 1984). Its fruit ripens 3 days before 'Dukat' (about a week before 'Senga Sengana,') but its color is less attractive and it is less productive. However, 'Paula' is more productive and has better quality than other cultivars ripening at the same time.

Materials and Methods

In 1981, 'Paula' and 'Dukat' were planted at two locations, Brzezna in south Poland and Prusy in south central Poland. Plots were arranged in a randomized complete block design with plants in matted rows, 1 m apart. Each row consisted of 30 plants at a 25 cm spacings with four replications of each cultivar. Two standard cultivars, 'Surprize de Halles' and 'Senga Sengana,' were included in the study as controls. 'Surprize de Halles'

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is the standard very early cultivar, and makes up nearly 10% of the strawberry plantings in Poland. 'Senga Sengana' accounts for 72% of the total strawberry production in Poland. Plants were sprayed with fungicides to protect against *Botrytis*. Healthy fruit was harvested in 1982 and 1983, and yields were recorded.

Another similar planting was set at Skierniewice in central Poland, to evaluate the role of *Botrytis* in yields of these cultivars. Previously, Borecka et al.(1) reported that fruit loss of 'Senga Sengana' may exceed 50% when plants are unprotected from *Botrytis*. Plantings of 'Dukat' and 'Senga Sengana' were established as previously described. Plants were not sprayed and were harvested at 2-day intervals, from June 20 to June 28 in 1983, and from June 21 to June 27 in 1984.

Results and Discussion

Yields of four cultivars were recorded over a two-year period in Poland (Table 1). These observations indicated that 'Dukat' was as productive, or was more productive than 'Senga Sengana.' At the Brzezna Station, the yield of 'Dukat' was not significantly different than 'Senga Sengana.' In Prusy, the yield of 'Dukat' exceeded that of 'Senga Sengana' by at least 2 kg/plot in both seasons. 'Paula' yielded less than 'Dukat' and 'Senga Sengana' in 1982 at both locations. However, 'Paula' had greater total yield than 'Surprize de Halle.'

The 1983 season was dry during the period from bloom through harvest. Thus, *Botrytis* infection was low and yields were not affected by the rot

pathogen (Table 2). The 1984 season was cool with abundant precipitation throughout the growing season, so the incidence of *Botrytis* rot was high throughout Poland. *Botrytis* rot reduced the yield of 'Senga Sengana,' whereas the yield of 'Dukat' was unaffected.

Table 2. 'Dukat' and 'Senga Sengana' yields from unsprayed plants in Skierniewice, Poland, in a dry (1983) and a wet (1984) season.

Cultivar	Yield (kg/plot) ^a	
	1983	1984
Dukat	7.7 a	8.2 a
Senga Sengana	8.0 a	5.8 b

^aValues represent 4 replicates of each cultivar. Means within a column followed by different letters are significantly different at the 5% level according to Duncan's multiple range test.

Summary

Two promising strawberry cultivars, 'Dukat' and 'Paula', have been developed in Poland. These cultivars ripen before 'Senga Sengana' and are resistant to *Botrytis*. 'Dukat' is more productive and ripens 2 to 4 days before 'Senga Sengana'(2). It will extend the harvest period, which will result in more efficient use of the processing facilities. 'Paula' ripens a week before 'Senga Sengana' and is somewhat less productive, although more so than other cultivars ripening at the same time. Both cultivars are resistant to *Botrytis*, which eliminates the need for chemical control. Both 'Dukat' and 'Paula' represent genotypes that can contribute earliness and resistance to *Botrytis* in a strawberry breeding program.

Table 1. Yields of four strawberry cultivars planted at two locations in Poland.

Cultivars ¹	Ripening Season	Yield (kg) ¹			
		Brzezna		Prusy	
		1982	1983	1982	1983
Surprize de Halles	very early	14.3 a	7.8 a	7.0 a	7.9 a
Paula	early	16.1 ab	12.7 bc	11.8 a	6.9 a
Dukat	early to mid-season	19.4 c	11.7 b	15.7 c	14.4 c
Senga Sengana	mid-season	17.4 cd	12.0 b	13.3 b	11.2 b

¹Values represent means of 4 replications of each cultivar. Means within a column followed by different letters are significantly different at the 5% level according to Duncan's multiple range test.

Literature Cited

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Developing a Dual Purpose Peach in Louisiana

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Abstract

Over a two year period, 24 peach clones were evaluated for canning suitability. Five clones produced acceptable products. Of these, 4 were yellow-fleshed and 1 was white-fleshed. Only 1 yellow-fleshed peach was a genetic clingstone with non-melting flesh. All others were freestone types. The canned peaches were compared to 2 commercial clingstone packs. The 4 yellow-fleshed clones produced canned products similar to the commercial packs. The white peach yielded a bright, firm canned product.

Introduction

Traditionally, the genetic clingstone, non-melting flesh, peach is preferred for commercial canning while the genetic freestone, melting flesh, is normally grown for fresh market. Many of the characteristics which are desirable in a fresh market peach become liabilities in processing. High pH is dangerous with conventional boiling water processing because of the possibility of botulism. A peach with melting flesh will usually not maintain acceptable texture during heat treatment. Irregular flesh pigmentation which may be ignored in a fresh market peach often produces darkening in a canned product. Consumers of canned peaches prefer firm texture with moderate acidity and medium orange to yellow flesh with little

or no red coloration. Developing a peach suitable for both fresh and processed markets would be economically attractive to growers. The purpose of this research was to evaluate current clonal selections of the fresh market breeding program for such potential.

During the 1983 and 1984 seasons, 24 peach clones were evaluated for canning suitability. The peaches included genetic clingstones and freestones. The freestone types included the range from physiological clings through true freestones. Flesh colors of the fresh material ranged from white with red mottling to yellow-orange with and without red coloration. Red pigmentation in some clones extended from pit to skin throughout the flesh.

Procedures

All clones were harvested at approximately the same maturity stage and processed immediately. The peaches were washed, sorted, halved, pitted and peeled by hand. Peach halves were then placed into enamel-lined 303 x 406 cans, weighed, and covered with hot (88-93°C) 40 degree Brix sucrose syrup. Six cans of each clone were steam exhausted 5 minutes, sealed, and processed in boiling water for 20 minutes.

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