A study on some characteristics of peach and nectarine varieties grown on the highlands of northern Thailand[1]

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ABSTRACT

A study on some characteristics of Flordabelle, Flordared, Flordasun, Ying Ku, Ang Khang Red, Ang Khang, White peaches and "Sun Red" nectarine was conducted at Ang Khang Station during 1978-1979 season. Vegetative characters included in the study were number of leaves in current season shoot, length and width of mature leaf, leaf dry weight and leaf area. The reproductive characters included fruit weight, fruit volume, length and width of harvested fruit, percent total soluble solids and total titrable acid in the fruits, stone weight and stone volume. These vegetative and reproductive characters were found to be different among the varieties studied, and might be included as the criteria to distinguish peach varieties grown in Thailand.

INTRODUCTION

Peach (*Prunus persica L.),* which is a native of china, had been extensively distributed to Europe, America, Australia, and Eastern Asia (Bagenal, 1978). Peaches in Thailand, that had been long-time well known as a local variety, were brought in by hill-tribe villagers migrated from China to the northern part of Thailand. (Punsri et. al., 1978) These peaches produced small and low quality fruits which are not suitable as substitution for poppy growing, therefore, new varieties of peaches were introduced for adaptability test under Thailand conditions (Subhadrabandhu, 1973).

Some characteristics and growth habits of each introduced variety were changed when the plants were introduced and grown under the environment of Thailand. Hence, the study on characteristics of peaches was conducted so that necessary informations would be available for peach growing in Thailand and for other researches in the future.

MATERIALS AND METHODS

The study consisted of six varieties of peaches and one variety of nectarine : Ang Khang Red, Ang Khang White, Ying Ku, Flordared, Flordabelle, Flordasun peaches

1 Approved for publication by the Horticulture Department, Kasetsart University as Journal Article No. Hort. 23-008

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and Sun Red nectarine, respectively. Three plants of each about six years old grown at Royal Ang Khang Station were selected and randomly sampled using 50 units each. The samples were taken from shoots of current season growth, from the 10 th leaf of that shoot, and from fruits. The characters studied were :

1) Vegetative growth consisted of the length of current season shoot measured at the end of the growing season, leaf width measured in cm, while leaf area was measured as sq cm by planimeter.

Number of leaves was presented as an average from individual sampling shoot, while dry weight was the weight in grams per leaf of those dried at 60°c for 3 days.

2). Characteristics of fruits were fruit length and width measured in cm by vernier calipers, the volume of fruit and stone as sq mm of replaced water in measuring cylinder, and the weight in gm of fruit and stone. Also, fresh juice of peaches was measured for % total soluble solids by hand sugar refractometer and was tritated for acidity (mg of malic acid with 0.009 N NaOH).

The study was conducted from December, 1978 to June, 1979 at Doi Ang Khang and at the Department of Horticulture, Kasetsart University. The experiment was a completely randomized design which had each variety as treatment. Statistical analysis was analyses of variance and Duncan's Multiple Range Test at 0.05 level of significance.

RESULTS AND DISCUSSION

Analysis of variance has shown that there was highly significant difference among varieties for all characters studied.

1). **Vegetative growth** (Table 1 and Fig 1)

1.1 For shoot at current season, Flordabelle's was the longest (19.66cm) but was not statistically different from Flordasun's (18.12cm) Ang Khang White and Ang Khang Red were the two with shortest shoots (3.9 and 3.7cm), however, they were statistically different from Flordared, Sun Red, and Ying Ku (13.50, 13.68, and 14.71cm, respectively).

1.2 Flordabelle had the highest number of leaves on the current season shoot (19.16), while Ang Khang White had the lowest (8,98) "Sun Red" nectarine was not statistically different when compared to Flordasun and Ying Ku.

1.3 For leaf length, Flordasun had the longest leaf (12.78cm) but was not statistically' significant from Flordabelle and Ying Ku (12.72 and 12.69cm, respectively). The shortest leaf was reported on Ang Khang White as 8.26cm.

1.4 The leaves of Flordasun and Flordared were 3.63 and 3.56cm wide, respectively and were statistically different from the narrowest Ang Khang Red (2,22cm).

1.5 The highest leaf area was found in Flordasun (30.30cm^2) while the smaller but not significantly different were Ying Ku, Flordabelle and Flordared (29.61, 28.53, and 28.17 cm^2 respectively). The smallest was Ang Khang Red (12.18cm^2) which was not statistically different from Ang Khang White (13.16cm^2).

1.6 The highest dry weight of a leaf was found in Flordasun (0.37 g) and the lowest was Ang Khang Red (0.08g). Although, the range of variability was so wide, all varieties were statistically different for this character.

2) **Characteristics of Fruits** (Table 2 and Fig. 2)

2.1 The largest fruit volume was observed on Flordabelle (88.82cm) and the smallest was Sun Red nectarine (8.48cm). And Khang Red and Ang Khang White were the only two varieties that were not significatly different.

Table I Vegetative characters of peach and nectarine varieties (data averaged from 50 samples)

Variety	Length of current season shoot (cm)	Number of leaf in the current season shoot	Leaf length (cm)	Leaf width (cm)	Leaf area (cm^2)	Dry weight of one leaf (gm)
Ang Khang Red	3.90 c*	11.62 dc	2.22 f	8.99 d	12.18 c	0.08 g
Ang Khang White	3.70 c	8.98 e	2.65 e	8.26 e	13.16 c	0.10 f
Ying Ku	14.71 b	15.36 c	3.85 a	12.69 a	29.61 a	0.23 e
Flordared	13.50 b	17.74 b	3.56 b	11.72 b	28.17 a	0.34 c
Flordabelle	19.66 a	19.16 a	3.37 c	12.72 a	28.53 a	0.35 b
Flordasun	18.12 a	15.06 c	3.63 b	12.73 a	30.30 a	0.37 a
Sun red Nectarine	13.63 b	14.53 c	3.01 d	10.51 c	21.17 b	0.29 d

*Means within the same parameter followed by similar letters are not significantly different at the 5% level by Duncan's Multiple Range Test.

Table 2 Reproductive characters of peach and nectarine varieties (data averaged from 50 samples)

Variety	Volume of a fruit (cm^3)	Weight of a fruit (gm)	Fruit Length (cm)	Fruit width (cm)		Acidity %	Volume of a stone (cm^3)	Weight of a stone (gm)
Ang Khang Red	40.07 c*	39.63 d	4.45 c	4.16 d	11.46b	15.92 a	2.05 e	2.08 d
Ang Khang White	39.83 c	40.41 d	4.22 d	4.17 d	10.38c	14.30 b	2.49 d	2.51 c
Ying Ku	72.82 b	76.61 b	6.00 a	5.04 b	10.82c	8.82 d	3.58 b	3.65 b
Flordared	39.02 c	45.00 c	4.25 d	4.34 c	13.27a	10.59 c	3.40 c	3.51 b
Flordabelle	83.02 a	88.82 a	5.33 b	5.55 a	12.12b	6.13 e	4.16 a	4.16 a
Flordasun	25.80 d	26.66 e	3.56 e	3.49 e	11.78b	1.33 f	2.00 e	1.52 e
Sun RedNectarine	5.62 e	8.48 f	2.27 f	2.39 f	12.23b	1.86 f	1.00 f	1.11 f

*Mean within the same parameter followed by similar letters are not sighficantly different at the 5% level by Duncan's Multiple Range Test.

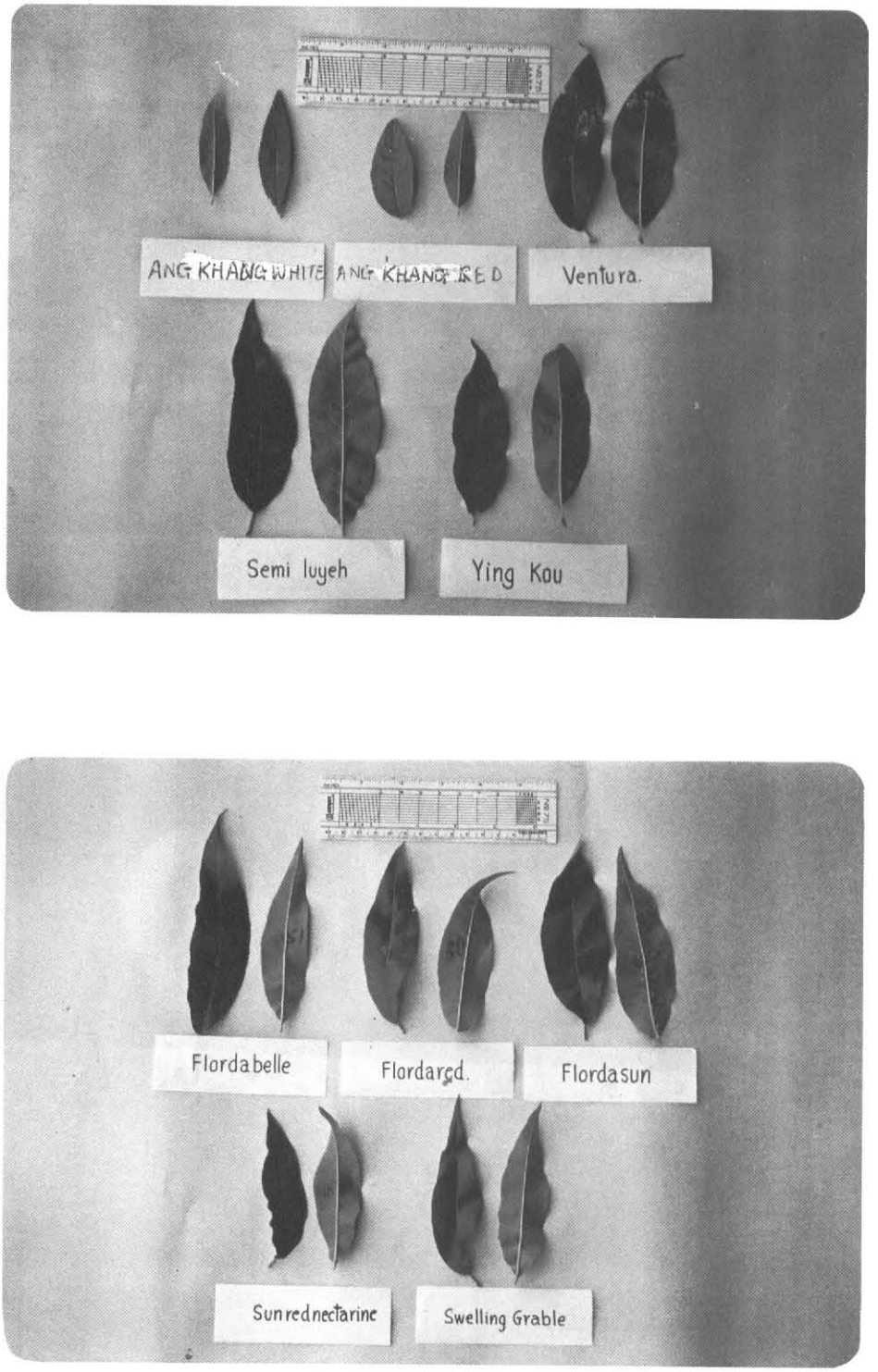
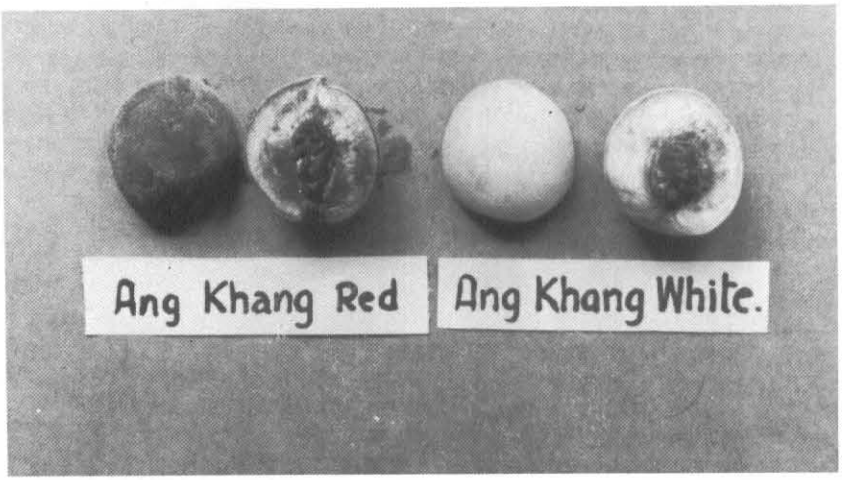
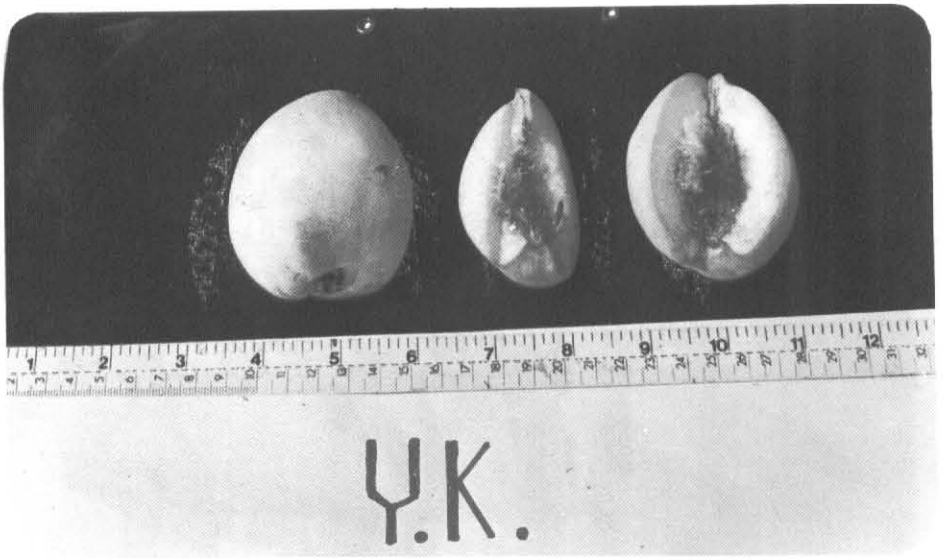


Fig. 1 Leaf characters of the peach and nectarine varieties.


Ang Khang Red
Ang Khang White.


Y.K.

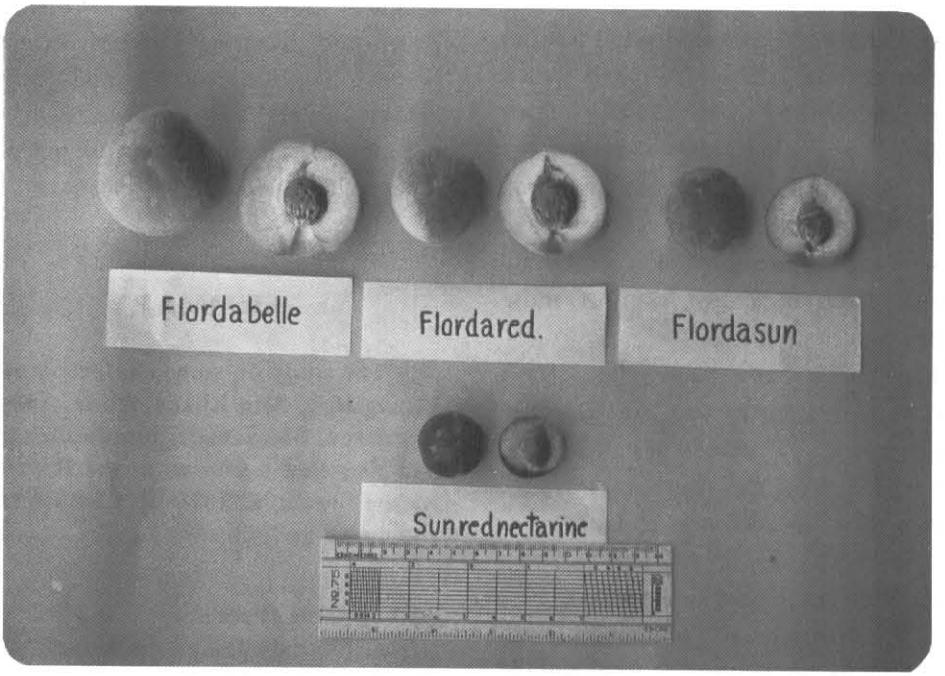


Fig 2 Fruit of the peach and nectarine varieties : a) Ang Khang Red and Ang Khang White b) Ying Ku and c) Flordabelle, Flordared, Flordasun and Sunred nectarine.

2.2 The average weight of a mature fruit had a wide range of variability (88.82 to 8.47g). Flordabelle was the highest followed by Ying Ku (76.61g), Flordared (45.00g), (26.66g) and, Sun Red (8.48g). The differences were statistically significant for all except Ang Khang Red and Ang Khang White.

2.3 The widest fruit was found on Flordabelle (5.55cm) and the narrowest was Sun Red (2.39cm). Statistical difference had shown for all varieties except Ang Khang Red and Ang Khang White.

2.4 Ying Ku was the longest fruit (6.00cm) while Sun Red was the shortest (2.27cm). The results of fruit length were also in the same order to those of fruit width.

2.5 Flordared resulted in highest percent of total soluble solids (13.27%) which was statistically different from other varieties. The lowest,Ang Khang White was also significantly different from others except Ying Ku.

2.6 For the acidity content, Ang Khang Red contained the highest amount (15.92%). and the lowest was reported as Flordasun (1.33%). Statistically difference was found on all varieties except Flordasun and Sun Red.

2.7 The volume of peach stone was significantly different among all varieties except Flordasun and Ang Khang Red. Also Flordabelle was the highest (4.16 cm^3) and Sun Red was the lowest (1.00 cm^3)

Most varieties in this study have round fruit shape except Flordabelle, Flordared and Ying Ku. which are round but also pointed at bottom end (Fig 2). Sizes and the average weight of fruit were significantly different. Flordabelle had the largest fruit followed by Ying Ku, Flordared, Ang Khang White, Ang Khang Red, Flordasun and Sun Red nectarine. Similar results were observed on the volume of fruit when

Flordabelle was the highest and Sun Red was the lowest.

At ripening, Flordabelle and Flordasun will have yellow-green skin with red-blotched, and orange color for Flordared. Ang Khang Red showed more red-blotched with deeper suture than Ang Khang White. Sun Red nectarines have yellow-red, non-pubescent skin which are different from pubescent skin of those peaches (Bagenal, 1948).

Flordabelle have pale yellow fresh color while Flordasun and Sun Red are orange-yellow. Flordared has the same white fresh as Ying Ku, Ang Khang White, and Ang Red. Ying Ku is also classified as clingstone, while Ang Khang Red and Ang Khang White are freestone peaches.

The "sweetness" of fruit was determined by the percent of total soluble solids as well as the acidity content. The varieties were ranked for "sweetness" from high to low as Flordared, Sun Red, Flordabelle, Flordasun, Ang Khang Red, Ang Khang White and Ying Ku. Also, those varieties with high to low stone weight were Flordabelle, Ying Ku, Flordared, Ang Khang White, Ang Khang Red, Flordasun and Sun Red, respectively.

Since current season shoots would be flowering and fruiting in the following season, those varieties with longest shoots such as Flordabelle and Flordasun would yield more than other varieties (Punsri et.al., 1973). Ying Ku and Ang Khang White were the two varieties with widest and narrowest leaves, respectively. The variety with largest leaf area could conduct more photosynthesis yielding the highest dry weight of leaves as observed on Flordasun of this study.

It is also observed that all characters of Ang Khang White was comparable to those of Ang Khang Red. While Sun Red nectarine was significantly different from all peach varieties.

Almost all characters studied in Thailand could be used to distinguish peach and nectarine varieties (except the percent of total soluble solids and the acidity content). This is due to different ripening stage which may cause inaccuracy on calculation and measurement.

SUMMARY

The study on some characters of Ang Khang Red, Ang Khang White, Ying Ku, Flordared, Flordabelle, Flordasun peaches and Sun Red nectarine at the Royal Ang Khang Station in 1978-1979 season can be concluded as followed.

A) Vegetable characters.

1. Flordabelle had the longest current season shoot and Ang Khang Red the shortest.

2. The highest number of leaves on the current season shoot was found in Flordabelle while Ang Khang White had the lowest leaf number.

3. Flordasun had the longest and widest leaf while Ang Khang White and Ang Khang Red had the shortest and narrowest matured leaf.

4. The highest leaf area was found in Flordasun and lowest in Ang Khang Red.

5. Highest leaf dry weight was found in Flordasun while the lowest was found in Ang Khang Red.

B) **Reproductive characters.**

1. Flordabelle produced the largest fruit (in volume weight and width) while Sun Red nectarine fruit was the lowest. Also in this study the longest fruit was found in Ying Ku variety.

2. Flordared gave the highest figure in percent total soluble solids white Ang Khang White gave the lowest.

3. The highest acid content was found in Ang Khang Red fruit and the lowest was found in Flordasun.

4. Flordabelle gave the biggest stone (i.e.highest in both volume and weight) while Sun Red nectarine gave the lowest.

ACKNOWLEDGEMENT.

The author appreciated the technical assistantes from Mr. Charun Henpithaksa, Mr. Titi Chalermchong and Miss Sirikul Wasee. The financial support from ARS/USDA is also acknowledged with thanks.

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