



THAI AGRICULTURAL STANDARD

TAS 6-2005

BANANAS

**National Bureau of Agricultural Commodity and Food Standards
Ministry of Agriculture and Cooperatives**

ICS 67.080.01

ISBN 974-403-336-3

UNOFFICIAL TRANSLATION



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National Bureau of Agricultural Commodity and Food Standards

Ministry of Agriculture and Cooperatives

50 Phaholyothin Road, Ladyao, Chatuchak, Bangkok 10900

Telephone (662) 561 2277 www.acfs.go.th

Published in the Royal Gazette Vol.122 Section 122D,

dated 22 December B.E.2548

Sub Committee on the Elaboration of Standards for Kluai Hom, Kluai Khai

1. Chairman of the Sub Committee
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Ms.Nalinthip Peanee Secretary of the Sub Committee
12. Representative of the National Bureau of Agricultural Commodity and Food Standards
Ms.Chutiwan Tochai Assistant Secretary of the Sub Committee

Bananas are important agricultural commodities of Thailand. They can be produced throughout the country. In particular Kluai Hom and Kluai Khai have good potentiality in production and export. In order to provide the fruit with better acceptance both nationally and internationally in term of food safety and export promotion. The Ministry of Agriculture and Cooperatives deems it proper to have a standard for bananas established.

The provisions of this standard are based upon the information of the following documents:

The Bureau of Standards and Agricultural Commodity Inspection. B.E. 2545 (2002). Notification of the Ministry of Agriculture and Cooperatives on Thailand Standard for Bananas, Kluai Hom. B.E. 2545 (2002). Notified on 27th March 2002 (B.E. 2545).

FAO/WHO. 1997. Codex Alimentarius Volume 5B. Fresh Fruit and Vegetables, CODEX STANDARD FOR MANGOSTEENS (CODEX STAN 205 - 1997). Joint FAO/WHO Food Standard Programme, FAO, Rome. 8 p.

Remark:

The standard title has been revised from “Thai Agricultural Commodity and Food Standard (TACFS X-XXXX)” to “Thai Agricultural Standard (TAS X-XXXX)” in accordance with the application of the Agricultural Standards Act B.E. 2551 (2008).



**NOTIFICATION OF THE NATIONAL COMMITTEE ON
AGRICULTURAL COMMODITY AND FOOD STANDARDS
SUBJECT: THAI AGRICULTURAL COMMODITY AND FOOD STANDARD:
BANANAS
B.E. 2548 (2005)**

The resolution of the 2/2548 session of the National Committee on Agricultural Commodity and Food Standards dated 29 August B.E. 2548 (2005) endorsed the Thai Agricultural Commodity and Food Standard entitled Bananas. This standard would be of benefits for quality improvement, facilitating trade and protecting consumers.

By virtue of the Cabinet Resolution on Appointment and Authorization of the National Committee on Agricultural Commodity and Food Standards dated 19 November B.E. 2545 (2002), the Notification on Thai Agricultural Commodity and Food Standard entitled Bananas is hereby issued as voluntary standard, the details of which are attached herewith.

Notified on 29 September B.E. 2548 (2005)

Khunying Sudarat Keyuraphan

Minister of Agriculture and Cooperatives

Chairperson of the National Committee on Agricultural Commodity and Food Standards

THAI AGRICULTURAL STANDARD

BANANAS

1 DEFINITION OF PRODUCE

This standard applies to commercial varieties of bananas grown from *Musa spp.* of the *Musaceae* family, for fresh consumption. A list of bananas varieties is indicated in the table of Annex A.

2 PROVISIONS CONCERNING QUALITY

2.1 MINIMUM REQUIREMENTS

2.1.1 In all classes, subject to the special provisions for each class and the tolerances allowed, the bananas must be as follows:

- whole;
- firm;
- characteristics and property of the variety;
- fresh in appearance, not affected by rotting;
- clean, practically free of any visible foreign matter;
- practically free of any conspicuous bruises ;
- normal in shape of fruit and pedicel that the pedicel is not damaged due to fungi or desiccation ;
- practically free of pests affecting the general appearance of the produce;
- practically free of damage caused by pests, excluding those affecting its eating quality;
- free of pistils;
- free of damage caused by low and/or high temperatures;
- free of abnormal external moisture, excluding condensation following removal from cold storage and modified atmosphere conditions;
- free of any foreign smell and/or taste.

In addition, hands and clusters must include:

- the crown is sound, transverse section cut is smooth, clean and not tearing;
- no wound from trimming which affects appearance of the produce.

2.1.2 The bananas should reach the appropriate stage of physiological maturity and becomes ripe after harvest. The condition corresponds to particular characteristics of the variety and planting location. The eating quality is acceptable by consumer and the produce arrives in satisfactory condition at the place of destination.

2.2 CLASSIFICATION

Bananas are classified into three classes defined below:

2.2.1 “Extra” Class

Bananas in this class must be of superior quality. They must be characteristics in shape, colour and taste of the variety. The fingers are free from defects, with the exception of slight superficial defects which are not obvious and do not affect the general appearance of the produce, the quality, the keeping quality and the presentation in the package.

2.2.2 Class I

Bananas in this class must be of good quality. They must be characteristics in shape, colour and taste of the variety. The fingers have slight defects of shape or color that do not affect the general appearance of the produce, the quality, the keeping quality and the presentation in the package.

Slight skin defects due to rubbing or other causes not exceeding 2 cm² of the total surface area are allowed, provided these do not affect the flesh of the banana.

2.2.3 Class II

This class includes bananas which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified in section 2.1 above. Defects in shape or colour are allowed, provided the bananas retain their essential characteristics as regards the quality and the keeping quality.

Skin defects due to scars or rubbing not exceeding 4 cm² of the total surface area are allowed, provided these do not affect the flesh of banana.

3 PROVISIONS CONCERNING SIZING

3.1 Size of Kluai Hom Thong and Kluai Kai are determined by weight or length or diameter indicated in table 1 and 2 as the following:

Table 1 Size code of Kluai Hom Thong

Size Code	Weight (g)	Length (cm)	Diameter (cm)
1	> 230	> 24	> 4.6
2	> 200-230	> 22-24	> 4.3-4.6
3	> 170-200	> 20-22	> 4.0-4.3
4	> 140-170	> 18-20	> 3.6-4.0
5	> 110-140	> 16-18	> 3.3-3.6
6	> 80-110	> 14-16	> 3.0-3.3
7	70-80	12-14	2.8-3.0

Table 2 Size code of Kluai Kai

Size Code	Weight (g)	Length (cm)	Diameter (cm)
1	> 100	> 13	> 3.8
2	> 85-100	> 11-13	> 3.5-3.8
3	> 70-85	> 9-11	> 3.0-3.5
4	> 55-70	> 7-9	> 2.5-3.0
5	40-45	7	2.0-2.5

3.2 Fruit Selection Method for Measurement of the Length and Diameter:

In case of hand, a single fruit or any finger of a couple at the middle of the hand, on the outer row of the cluster is selected.

In case of cluster, a single fruit next to the cut section of the hand, on the outer row of the cluster, is selected. If the cluster has 2 cuts, take the average of the fingers next to the cuts, on the outer row.

3.3 Method for Size Measurement.

- The length is determined along the outside curve from the blossom end to the base of the pedicel.
- The diameter is defined at the widest part of the finger.
- The weight is calculated that the weight of the hand is divided by the number of fingers.

4 PROVISIONS CONCERNING TOLERANCES

Tolerances in respect of quality and size shall be allowed in each package for produce not satisfying the requirements of the class indicated.

4.1 QUALITY TOLERANCES

4.1.1 "Extra" Class

Five percent by number or weight of bananas not satisfying the requirements of the class but meeting those of class I or, exceptionally, coming within the tolerances of that class.

4.1.2 Class I

Ten percent by number or weight of bananas not satisfying the requirement of the class but meeting those of class II or, exceptionally, coming within the tolerances of that class.

4.1.3 Class II

Ten percent by number or weight of bananas satisfying neither the requirements of the class nor the minimum requirements, with the exception of produce affected by rotting, or any other deterioration rendering it unfit for consumption.

4.2 SIZE TOLERANCES

For all classes, ten percent by number or weight of bananas not satisfying the requirements as regards sizing, but falling within the size immediately above or below.

5 PROVISIONS CONCERNING PRESENTATION

5.1 UNIFORMITY

The contents of each package must contain only bananas of the same origin and variety. The size and shape are uniform as well as the quality. The visible part of the contents of the package must be representative of the entire contents.

5.2 PACKAGING

Bananas must be packed in such a way as to protect the produce properly. The material used inside the packages must be new, clean, and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials for labeling must be safe for consumers.

5.2.1 Description of Containers

The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of the banana. Packages must be free of all foreign matter and smell.

5.3 PRESENTATION

Bananas may be presented in single finger, cluster, or in hand.

- Cluster must consist of a minimum of 2 fingers;
- Each package is allowed to contain only one cluster of different number of finger.

6 MARKING OR LABELLING

6.1 CONSUMER PACKAGE

Each packages shall bear the following particulars, legibly marked, and without false or deceptive information.

6.1.1 Nature of Produce

Each package shall be labeled "Banana" and/or "name of the variety" if the produce is not visible from the outside.

6.1.2 Net Weight in grams or kilograms

6.1.3 Distributor Information

Name and address of the distributor or packer or display of registered trade mark.

6.1.4 Origin of Produce

Identify country of origin to prevent misunderstanding.

6.2 NON-RETAIL CONTAINERS

Each package must bear the following particulars, in the documents accompanying the shipment, in the label, or on package, with legibly and indelibly marked.

6.2.1 Identification

Name and address of non-retailer, packer or distributor and identification code (optional)

6.2.2 Nature of Produce

Each package shall be labeled “Bananas” and/or name of the “variety”.

6.2.3 Origin of Produce

Identify country of origin and/or province where grown. If the afore mentioned data are not stated, it may lead to misunderstanding or deceiving the consumers.

6.2.4 Commercial Identification

6.2.4.1 Type of bananas: single, cluster (number of fruits) or hands;

6.2.4.2 Class;

6.2.4.3 Size code (optional);

6.2.4.4 Units per package or net weight in grams or kilograms.

6.3 LANGUAGE

Banana label shall carry Thai language, for export appropriate language shall be used.

6.4 OFFICIAL INSPECTION MARK

Comply with the provisions and condition of the inspection or certification agency recognized by Ministry of Agriculture and Cooperatives of Thailand.

7 CONTAMINANTS

Comply with the provisions of relevant regulations and the Thai Agricultural Standard on Contaminant.

8 PESTICIDE RESIDUES

Comply with the provisions of relevant regulations and the Thai Agricultural Standard on Pesticide Residues.

9 HYGIENE

Comply with the provisions of relevant regulations and the Thai Agricultural Standard on Hygiene.

Harvest and various steps in banana handlings including storage and transportation must be hygienically practiced in order to prevent contamination which will be harmful to consumers.

10 METHODS OF ANALYSIS AND SAMPLING

Comply with the provisions of relevant regulations and the Thai Agricultural Standard on Methods of Analysis and Sampling.

ANNEX A

LIST OF COMMERCIAL BANANA GROUPS AND VARIETIES

Group	Sub-Group	Cultivars
AA		<ul style="list-style-type: none"> - Kluai Khai; syn. Pisang Mas, Sunny Bunch, Golden banana, Sucrier banana - Kluai Leb Mua Nang
AAA	Cavendish	<ul style="list-style-type: none"> - Kluai Hom Khiew; syn. Pisang Masak Hijau - Khuai Hom Khiew Korm; syn. Dwarf Cavendish - Grand Naine - Williams - Kluai Nark; syn. Red banana
	Gros Michel	<ul style="list-style-type: none"> - Kluai Hom Thong - Kluai Hom Taiwan
ABB		<ul style="list-style-type: none"> - Kluai Hug Mook; syn. Silver Bluggoe, Kluai Som - Kluai Nam Wah; syn. Pisang Awak - Kluai Hin; syn. Saba

ANNEX B

CONTAMINANTS AND PESTICIDE RESIDUES

This annex reveals data of Contaminants and Pesticide Residues which are stipulated by low or related standards for convenient reference. However, these data are not taken as a part of section 7 and 8 of this standard.

This data may be reviewed that one should cling to the latest document for reference.

1 CONTAMINANTS

The Maximum Contamination Content of Lead

Code No.	Food	ML (mg/kg)
FI30	Assorted tropical and sub – tropical fruit – inedible peel	0.2

Source : CODEX STAN 230 – 2001

2 PESTICIDE RESIDUES

The application of pesticides must be in accordance with the recommendation of the Department of Agriculture or registered label approved by the Department of Agriculture, the Ministry of Agriculture and Cooperatives.

Maximum Residues Limits

Commodity	Pesticide	Residue definition	Maximum Residue Limit ; MRL (ml/kg)
Fruits (except as otherwise listed) ^{1/}	Azinphos -methyl	Azinphos - methyl	1
	Bromide ion	Bromide ion from all source but not including covalently bound bromide	20
Bananas ^{2/}	Chlorpyrifos	Chlorpyrifos	2
Bananas ^{2/}	Bitertanol	Bitertanol	0.5
	Cadusafos	Cadusafos	0.01*
	Carbofuran	Carbofuran	0.01*

Commodity	Pesticide	Residue definition	Maximum Residue Limit ; MRL (ml/kg)
	Chlorothalonil	Chlorothalonil	0.01*
	Dithiocarbamates	Dithiocarbamates	2
	Ethoprophos	Ethoprophos	0.02*
	Fenamiphos	Fenamiphos	0.05*
	Fenarimol	Fenarimol	0.2
	Fenbuconazole	Fenbuconazole	0.05
	Fenbutatin Oxide	Fenbutatin Oxide	10
	Fenpropimorph	Fenpropimorph	2
	Fipronil	Fipronil	0.005
	Flusilazole	Flusilazole	0.1
	Glufisinate - Ammonium	Glufisinate - Ammonium	0.2
	Haloxifop	Haloxifop	0.05*
	Imazalil	Imazalil	2 ^{Po}
	Imidacloprid	Imidacloprid	0.05
	Mycrobutanil	Mycrobutanil	2
	Prochloraz	Prochloraz	5 ^{Po}
	Propiconazole	Propiconazole	0.1
	Tebuconazole	Tebuconazole	0.05
	Terbufos	Terbufos	0.05
	Thiabendazole	Thiabendazole	5 ^{Po}
	Triadimenol	Triadimenol	0.2

^{1/} Source : Codex Alimentarius : Pesticide Residues in Food, Maximum Residue Limits. Extraneous Maximum Residue Limits, 12 April 2005.

^{2/} Source : Thai Agriculture Commodity Standard for Pesticide Residues : Maximum Residue Limits (TAGS 9002 – 2547).

Symbol * that follows some MRL is that value of Limit of Quantitation ; LOQ.

Symbol ^{Po} that follows some MRL is that residue which derives from the post harvest use of pesticides.

Extraneous Maximum Residue Limits

Commodity	Pesticide	Extraneous Maximum Residue Limits (mg/kg)
Fruit ^{1/}	Aldrin and Dieldrin	0.05
	Chlordane	0.02 *
	DDT	0.01 *
	Endrin	0.01 *
	Heptachlor	0.01 *

^{1/} Source : Thai Agriculture Commodity Standard for Pesticide Residues : Maximum Residue Limits (TAGS 9003 – 2547).

^{2/} Definition of residue : The total of HHDN and HEOD (fat soluble).

^{3/} Definition of residue : for plant commodities : the total of cis-and trans-chlordane (fat soluble).

^{4/} Definition of residue : the total of para, para DDT (p,p' – DDT), ortho, para DDT (o,p' – DDT), para, para DDE (p,p' – DDE) and para, para TDE (DDD){p,p' – TDE (DDD)}(fat soluble).

^{5/} Definition of residue : the total of endrin and delta – keto – endrin (fat soluble).

^{6/} Definition of residue : the total of heptachlor and heptachlor epoxide (fat soluble).

Symbol * that follows some MRL is that value of Limit of Quantitation ; LOQ.

ANNEX C

FRUITS OF KLUAI HOM AND KLUAI KHA
(Example)

KLUAI HOM



Fig. 1 Characteristics of a fully (>90%) mature banana. The fruit is round, not angular (A) and an angular fruit is obvious on 80% mature banana (B)

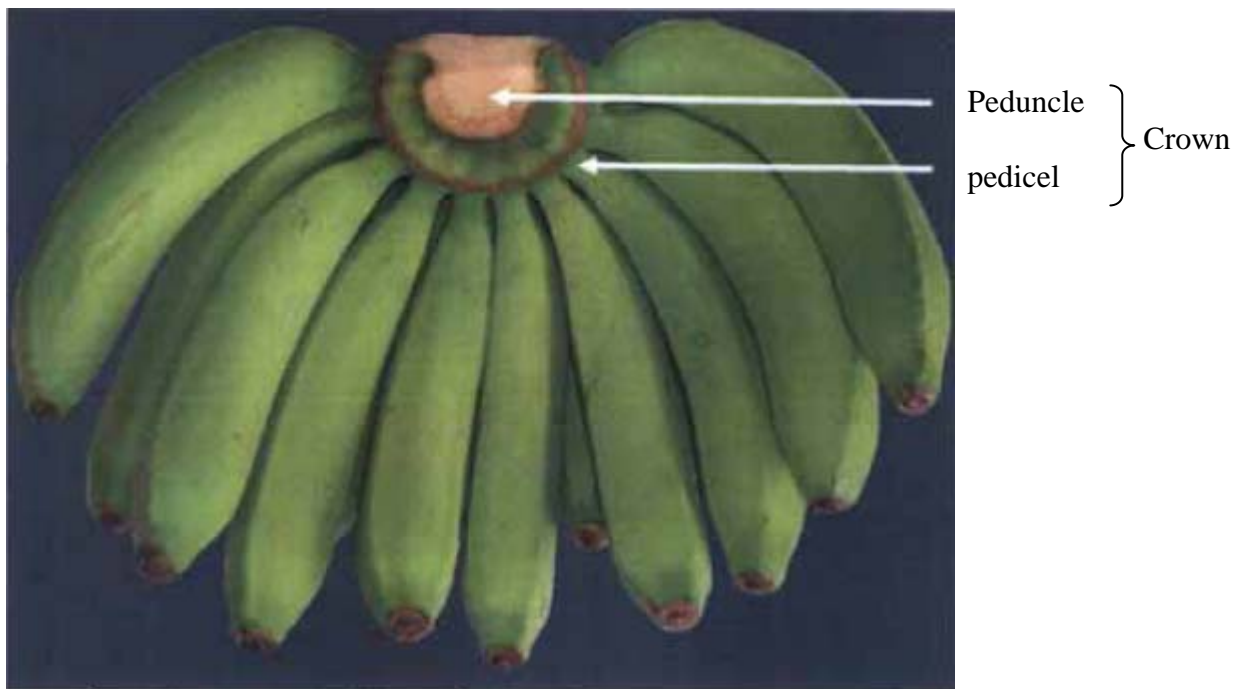


Fig. 2 Characteristics of a perfect hand of bananas.



Fig. 3 Characteristics of a cluster.

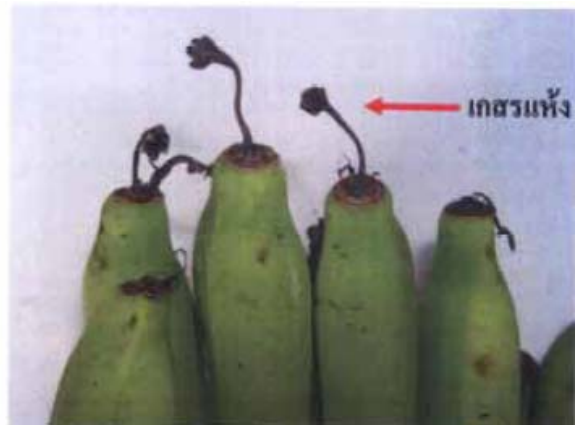


Fig. 4 Withered floral parts attached to the fruit ends.



Fig. 5 Different size fingers in a hand.



Fig. 6 Irregular arrangement of fingers in a hand.



Fig. 7 A double-finger.



Fig. 8 A crack finger.

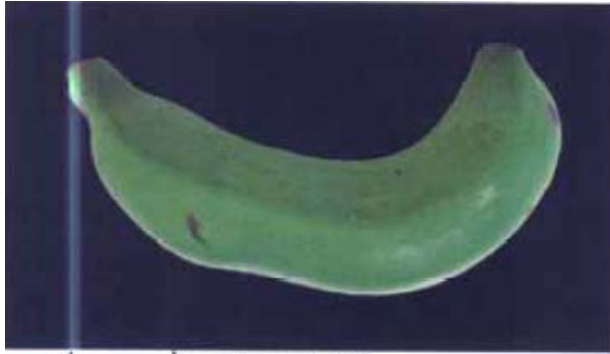


Fig. 9 A malformed finger.



Fig. 10 A twisted finger.



Fig. 11 A bruised finger



Fig. 12 A finger with sunburn on skin.



Fig. 13 A finger damaged by birds.



Fig. 14 A finger damaged by rodents.



Fig. 15 A finger with scars due to lady beetles.



Fig. 16 A finger with scars due to thrips at the floral stage.

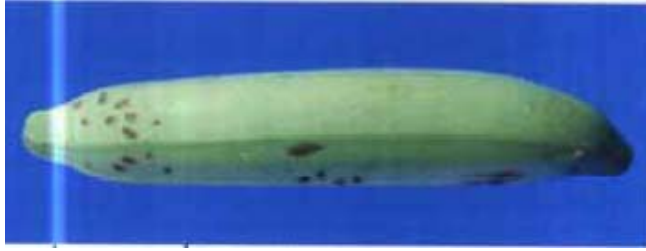


Fig. 17 A finger with scars due to piercing insects.



Fig. 18 Banana peels at the contacted fingers resulting reddish mark (acceptable).



Fig. 19 Appearance of cracks at the fruit ends (not acceptable).



Fig. 20 Disease symptom of the last-hand peduncle (acceptable after proper trimming)

KLUAI KHAI

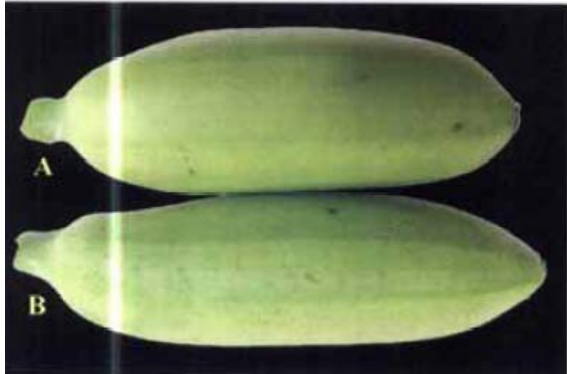


Fig. 1 Characteristics of a finger > 80% mature is a round fruit, and slightly 8 (D) and 9 angular (A) and 80% mature is obviously angular (B).

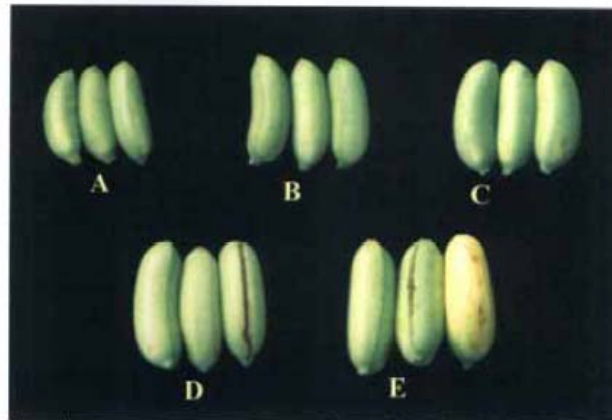


Fig. 2 Characteristics of fingers harvested at 5 weeks (A), 6 (B), 7 (C), 8 (D) and 9 (E) weeks after the floral bud was detached.



Fig. 3 Different size fingers in one hand (the last hand).



Fig. 4 Withered floral parts attached to the fruit ends.

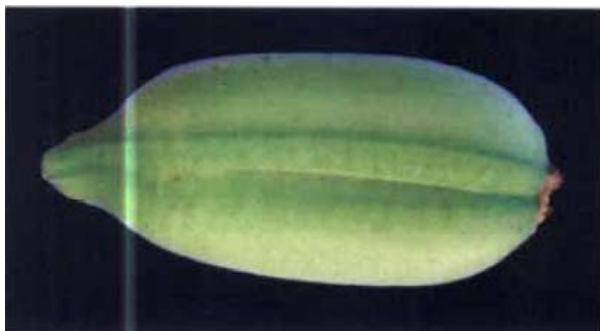


Fig. 5 A double finger.



Fig. 6 A Crack finger.



Fig. 7 A finger with bruised lesions.



Fig. 8 A blade cut on a finger.



Fig. 9 A finger with skin freckles.



Fig. 10 A finger with scars due to thrips.



Fig. 11 A finger with scars due to lady beetles.



Fig. 12 A finger damaged by birds.

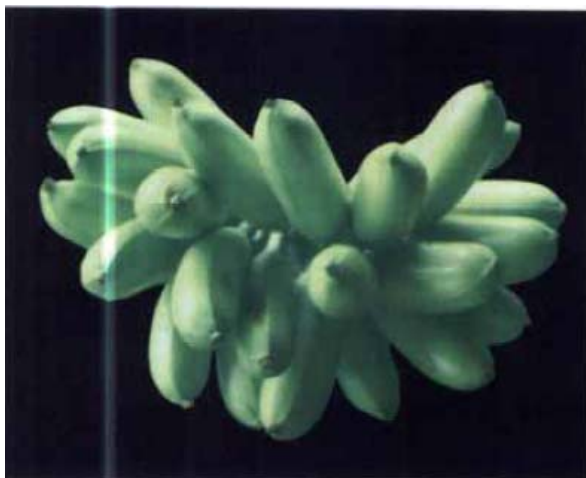


Fig. 13 A hand with irregular arrangement of fingers.



Fig. 14 Clusters of various number of fingers.

ANNEX D**UNIT**

The units and symbols used in this standard and the units recognized by the International System of Units (*le Système International d'Unités*) or SI are as follows:

Measurement	Unit	Symbols
Area	square centimeter	cm ²
Length	centimeter	cm