

PHILIPPINE NATIONAL STANDARD

PNS/BAFPS 13:2004
ICS 65.020.20

Fresh fruit – Mangoes - Specification

Foreword

The formulation of this Philippine National Standard for Fresh Fruits – Mangoes, PNS/BAFPS 13:2004 was initially undertaken in July 2001 under the Bureau of Agriculture and Fisheries Product Standards (BAFPS)' Technical Assistance on Safety and Quality Standards Covering Products of High Value Commercial Crops, in view of the increasing demand of the commodity for the domestic and export markets.

This standard supersedes the PNS 168:1991 prepared by the Bureau of Product Standards' Technical Committee on Agricultural & Other Food Products and its Sub-Committee on Fresh Fruits, BPS/TC 20/SC 5. This revision was undertaken to update the standard in order to cope to the increasing needs of the industry. Modifications were made on the various clauses: definition of terms, grading, size classification, tolerances, packaging, contaminants and hygiene. The maximum levels for heavy metals and pesticide residues are included in this standard.

In 2003, the Bureau of Agriculture and Fisheries Product Standards (BAFPS) conducted series of technical reviews and public consultations nationwide on the draft standards for fresh mango fruits prior to its approval.

The Technical Committee and Sub-Committees of BAFPS organized through Special Order No. 411, series of 2001 set the classification of fresh mango fruit based on their physical characteristics and current practices existing in the sectors concerned.

In the preparation of this standard the following documents were considered:

Coates, L.T. Cooke, D. Persley, B. Beattie, N. Wade and R. Ridgway, 1995, Postharvest Diseases of Horticultural Product: Tropical Fruit (Vol. 2). Manager Publishing Services, Department of Primary Industries, Australia.

Mendoza, D.B. and R.H.H. Wills. 1984. Mango: Fruit Development, Postharvest Physiology and Marketing in ASEAN. ASEAN Food Handling Bureau, Kuala Lumpur, Malaysia.

Organic Fruit and Vegetables from the Tropics. United Nations. New York and Geneva, 2003. Pp 109-118.

Pesticide residues in food. 1993. Joint FAO/WHO Food Standards Programme. Codex Alimentarius Supplement One to Volume Two. Codex Alimentarius Commission. United Nations. World Health Organization, Rome.

Philippine National Standards: Fresh Fruits and Vegetables – Mangoes (*Mangifera indica* Linn.) Grading and Classification. PNS 168:1991; Bureau of Product Standards, Department of Trade and Industry, Makati, Philippines.

Fresh Fruits – Mangoes – Specification

1 Scope

This standard establishes a system of grading and classifying commercial mango fruits grown from *Mangifera indica* Linn of the Mangiferae family produced in the Philippines to be supplied fresh to the consumer.

2 References

PNS ISO 874:2004 – Fresh fruits and vegetables – Sampling contains provisions which, through reference in this text form part of this national standard. At the time of publication, the edition indicated was valid.

3 Definitions

For the purpose of this standard, the following definitions shall apply:

3.1 General definitions**3.1.1****clean**

the fruit is free from any foreign matter

3.1.2**damage**

any defect or injury, which affects the appearance, shipping and eating qualities of the fruit

3.1.3**diameter**

the distance across the smallest round opening through which the mango will pass without pressure

3.1.4**fairly well formed**

the fruit may slightly deviate from its characteristic shape, but not to an extent whereby its appearance is materially affected

3.1.5**mango**

a tropical tree scientifically known as *Mangifera indica* Linn. Its fruit is a fleshy drupe, resinous, variable in shapes and dimensions, consisting of leathery peel, fleshy pulp and fibrous stone. There are many known varieties of mangoes in the Philippines of which 'Carabao' mango and 'Pico' mango are most noted

3.1.6

mature

the mango has reached the stage of development which ensures the proper completion of the ripening process (Annex A)

3.1.7

overripe

the fruit is very soft and has passed its commercial utility

3.1.8

smooth

the contour of the fruit is regular and free from ridges and grooves, or other irregularities of the peel of the fruit

3.1.9

well-formed

the fruit has the typical shape of the variety, symmetrical and without irregularities in shape

3.1.10

well-trimmed

the stem is neatly cut off at a point not more than 2.5 mm beyond the fruit

4 Kinds of Damage

4.1 Pre-harvest defects (see Annex D)

4.1.1 “Balat-kawayan” (evergreen) – Unusually deep green color of the peel which does not disappear with normal ripening.

4.1.2 Discoloration – Distinct deviation from the typical color of the fruit.

4.1.3 Heat injury – A portion of the peel which exhibits dull yellow to yellow in color.

4.1.4 “Intul-tol” – A disorder characterized by dark brown to black depression on the peel of the fruit, not localized and already apparent even while the fruit is on the tree.

4.1.5 Misshapen – the mango is irregular or abnormal in shape.

4.1.6 Mottling – Colored spots, blotches or clouding on the peel of the fruit.

4.1.7 “Ugat” – Netted appearance of the peel due to prominent veins which appears during rainy season.

4.1.8 Wind scar – Brownish streak, slightly elevated due to mechanical abrasion.

4.2 Pathological damage

4.2.1 Anthracnose – Small, circular, light brown lesions on the skin, which becomes apparent as the fruit ripens.

4.2.2 Scab – Patches with fissured corky tissue on the fruit.

4.2.3 Sooty mold – black powdery substance appearing as irregular spots on the surface usually on the pedicel end.

4.2.4 Stem-end rot – Black lesion on the skin at the stem end of the fruit. The lesion is soft, watery and affects the flesh.

4.3 Insect and animal damage (see Annex F)

4.3.1 Fruit fly – The external signs of fly infestation are soft brownish spots beneath the peel where the larvae cause extensive tissue damage. Further breakdown is accelerated by secondary microbial activity.

4.3.2 Helopeltis damage – Feeding points of the insect produce corky spots sometimes randomly scattered over the fruit surface; only the skin is affected; feeding injury is often called “kurikong” or “armalite”.

4.3.3 Insect and animal injury – Punctures, feeding and scratch scars, oviposition, entry/exit holes of insects visible to the naked eye.

4.3.4 Mealy bug damage – Stains the fruit white due to white flour-like substance, which covers its body surface. The damaged parts are also usually covered with black sooty mold growing on the honeydew produced by the mealy bug.

4.3.5 Scale insect damage – Feeding punctures left by the scale insect result in whitish to yellowish spots on the peel

4.4 Handling damage (see Annex G)

4.4.1 Abrasion – An abraded spot or area on the peel as a result of scraping or rubbing off.

4.4.2 Compression – Flattened and/or dented areas on the fruit which have been caused by pressure on the packaging material; the damaged portion of the peel fails to develop the normal color during ripening.

4.4.3 Crack – A split on the fruit which makes the pulp slightly visible.

4.4.4 Cut – Damage in the form of cleft or wound on the fruit caused by a sharp object.

4.4.5 Latex burn – Latex stains characterized by brownish streaks on the peel which may be sunken.

4.4.6 Latex stains – Ooze sap around the stem or on the cheeks of the fruit remaining as a clear, sticky fluid on the skin detracting from the fruit’s appearance.

4.4.7 Lenticel spotting – Tiny black spots (needle-sized) scattered on the fruit surface which are apparent in the green and ripe stage: occurrence is attributed to prolonged wet periods or soaking in water especially with detergent, leading to lenticel “blow out”.

5 Varieties

5.1 ‘Carabao’ – Fruit is oblong which blunt apex, full cheeks and a rather indistinct beak. When ripe, the flesh is golden yellow, very tender with delicate, aromatic non-turpentine flavor, exquisite sub-acid taste. The fiber is medium coarse but confined almost entirely to the edges of the stone. The peel is smooth and bright yellow when ripe and has delicate aroma. ‘Carabao’ mango is known in the international trade as “Philippine Super Mango”

5.2 ‘Pico’ – Fruit is medium-sized, more slender than the ‘Carabao’ mango, asymmetric with rounded apex and distinct beak. Peel is smooth, orange yellow, thick and tough when ripe. Flesh is yellow-orange, tender, richer and sweeter than ‘Carabao’ mango but lacks the delicate aroma of ‘Carabao’ mango. The fibers are fine, short and confined almost entirely to the edges of the stone.

6 Minimum requirements

In all classes, subject to the special provisions for each class and tolerances allowed, mango fruits shall meet the following requirements:

- 6.1** Mango must be mature and its shape characteristic of the variety.
- 6.2** Mango must be reasonably clean and free from any visible foreign matter.
- 6.3** Mango must be free from diseases and insects.
- 6.4** Mango must be free from any injury.

7 Classification

Mango fruit shall be classified according to its general appearance, quality and condition.

7.1 Extra class – Mangoes in this class shall be of superior quality and have the characteristic of the variety. They shall be mature, clean, well-trimmed, well-formed, smooth and free from pre-harvest defects and defects associated with insects, diseases and handling with the exception of very slight superficial defects, provided that these defects do not affect the general appearance of the produce, the keeping quality and presentation in the package.

7.2 Class I – Mangoes in this class shall be of good quality and have the characteristic of the variety. They shall be mature, clean, well-trimmed, well-formed, smooth and free from pre-harvest defects and defects associated with insects, diseases and handling with the exception of very slight superficial defects, provided that these defects do not affect the general appearance of the produce, the keeping quality and presentation in the package.

7.3 Class II – Mangoes in this class which do not qualify for inclusion in the higher classes but satisfy the requirement of class II. Mangoes shall be mature, fairly clean, well-trimmed, fairly well-formed, smooth and free from diseases, insect, infestation and any damage that materially affects the general appearance of the produce, the keeping quality and presentation in the package.

8 Size classification

Mango fruits may be classified according to weight as shown in Annex B.

9 Tolerances

9.1 Extra class – Five percent by number or weight of the fruit in any lot shall fail to meet the requirements of the class and shall conform to the requirements of class I.

9.2 Class I – Ten percent by count or weight is allowed for off-sized including not more than 1% by count for other defects shall fail to meet the but shall conform to the requirements of the next lower grade.

9.3 Class II – Ten percent by count or weight is allowed for off-sized including not more than 2% by count for other defects shall fail to meet the requirements.

10 Sampling

Sampling method to be used for ascertaining conformance to the requirements of this specification shall be in accordance with PNS ISO 874.

11 Provisions regarding presentation

11.1 Uniformity

Each package shall be uniform and contain only mangoes of the same origin, variety, quality and size. The visible part of the package shall be the representative of the entire contents.

11.2 Packaging

Mangoes shall be packed in suitable containers that will avoid causing any external or internal damage to the produce. The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of mangoes.

12 Marking or labelling

Each container shall have a label or legible characters grouped on the same side, stamped in indelible ink to provide the following:

12.1 Name of produce, variety or commercial type;

12.2 Class and size or number of pieces;

12.3 Net weight (in kilograms);

12.4 Name of producer and exporter; and

12.5 The words “Product of the Philippines”.

13 Contaminants

13.1 Heavy Metals

Mangoes shall comply with those maximum residue levels for heavy metals established by the Codex Alimentarius Commission for this commodity (Annex H).

13.2 Pesticide Residues

Mangoes shall comply with those maximum residue levels established by the Codex Alimentarius Commission for this commodity (Annex I).

14 Hygiene

14.1 It is recommended that the produce covered by the provisions of this standard be prepared and handled in accordance with appropriate sections of the Recommended International Code of Practice – General Provisions of Food Hygiene (CAC/RCP 1 – 1969, Rev. 2-1985) and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

14.2 The produce shall comply with microbial criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria for Foods (CAC/GL 21 – 1997).

15 Compliance and specification

When found to comply with the requirements specified in this Philippine Standard Specification, the lot, the batch, or the consignment from which the samples have been drawn, shall be deemed to comply with this Philippine National Standard Specification.

Annex A

Stages of ripeness of 'carabao' and 'pico' mango fruits

Stage of ripeness	Peel color	Flesh color
Green	Completely light green	Yellowish white or light yellow green
Breaker	Traces of yellow	Middle area and fruit outline yellowish; other areas, white to yellowish white
Turning	More green than yellow	More yellow than white
Semi-ripe	More yellow than green	Yellow for 'carabao'; yellow orange for 'pico'
Ripe	80-100% yellow ('carabao') or yellow orange ('pico')	Middle area yellow for 'carabao'; yellow orange for 'pico'
Overripe	Yellow for 'carabao'; yellow orange for 'pico'	100% yellow for 'carabao' and yellow orange for 'pico'

Annex B

Size classification of green 'carabao' mango fruits

Size	Weight (g)	Number of pieces/carton			
		2.5 kg	5.0 kg	10 kg	12.0 kg
Extra large	> 350	6 - 7	12 - 14	24 - 28	30 -32
Large	300 - 349	8	16	32	41- 43
Medium	250 - 299	10	20	40	41 – 50
Small	200 - 249	12	24	48	51 – 63
Super small	160 - 199	14 - 16	28 - 32	56 - 64	64 – 75

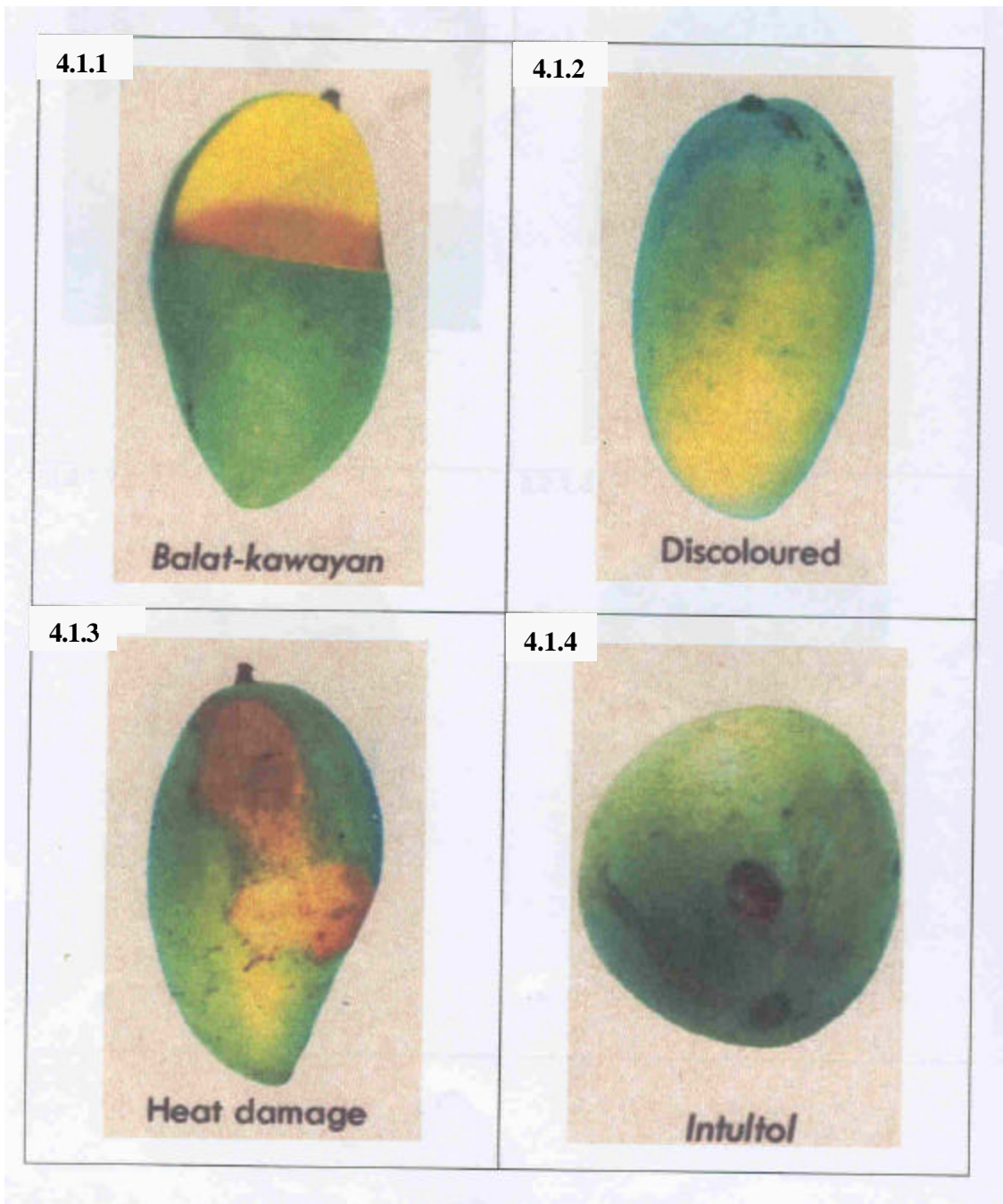
Annex C

Size classifications of 'pico' mango fruits

Size	Weight (g)
Extra large	> 300
Large	251 – 300
Medium	201 – 250
Small	151 – 200
Super small	> 100

Annex D

Pre-harvest defects



4.1.5



4.1.6



4.1.7

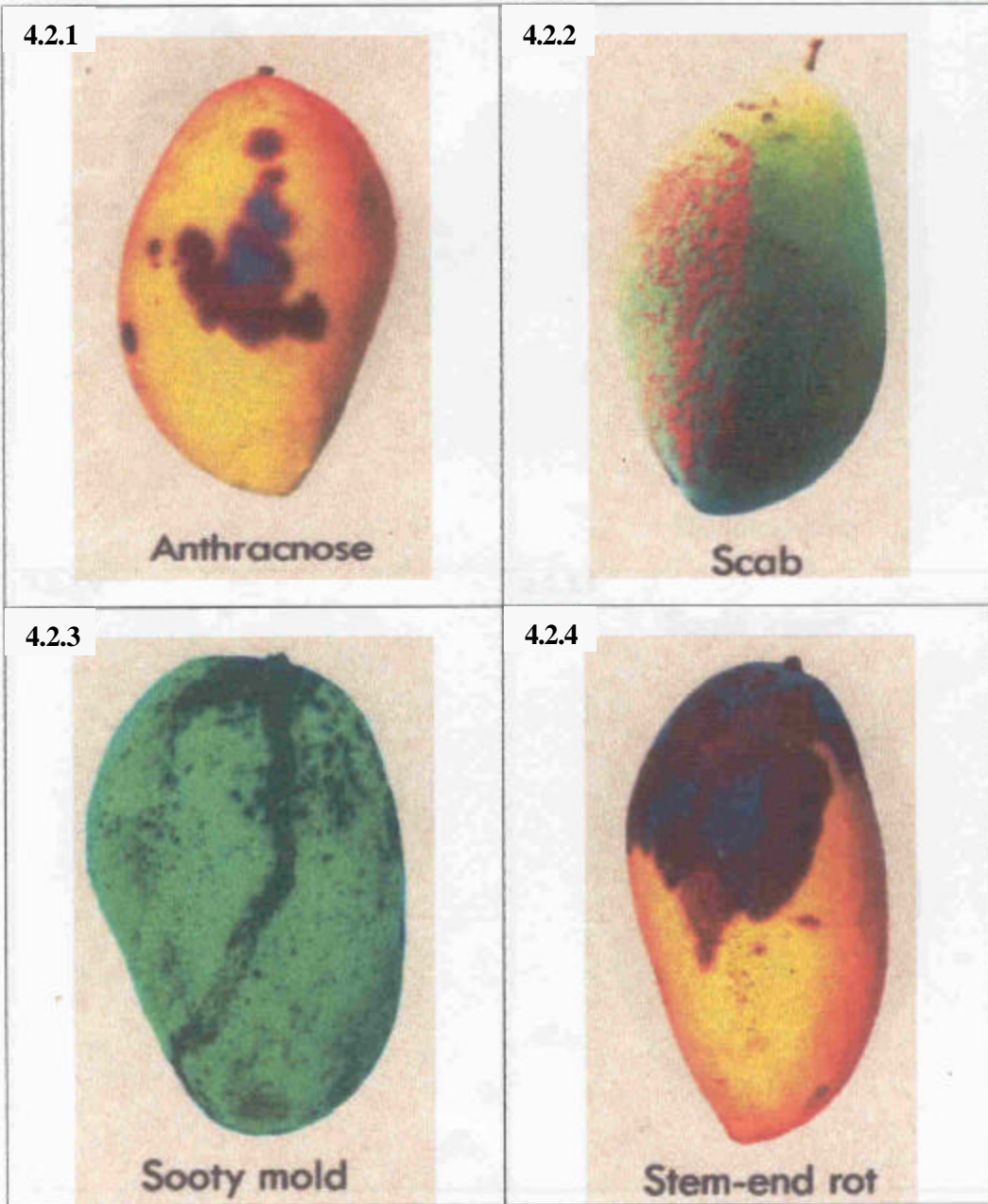


4.1.8



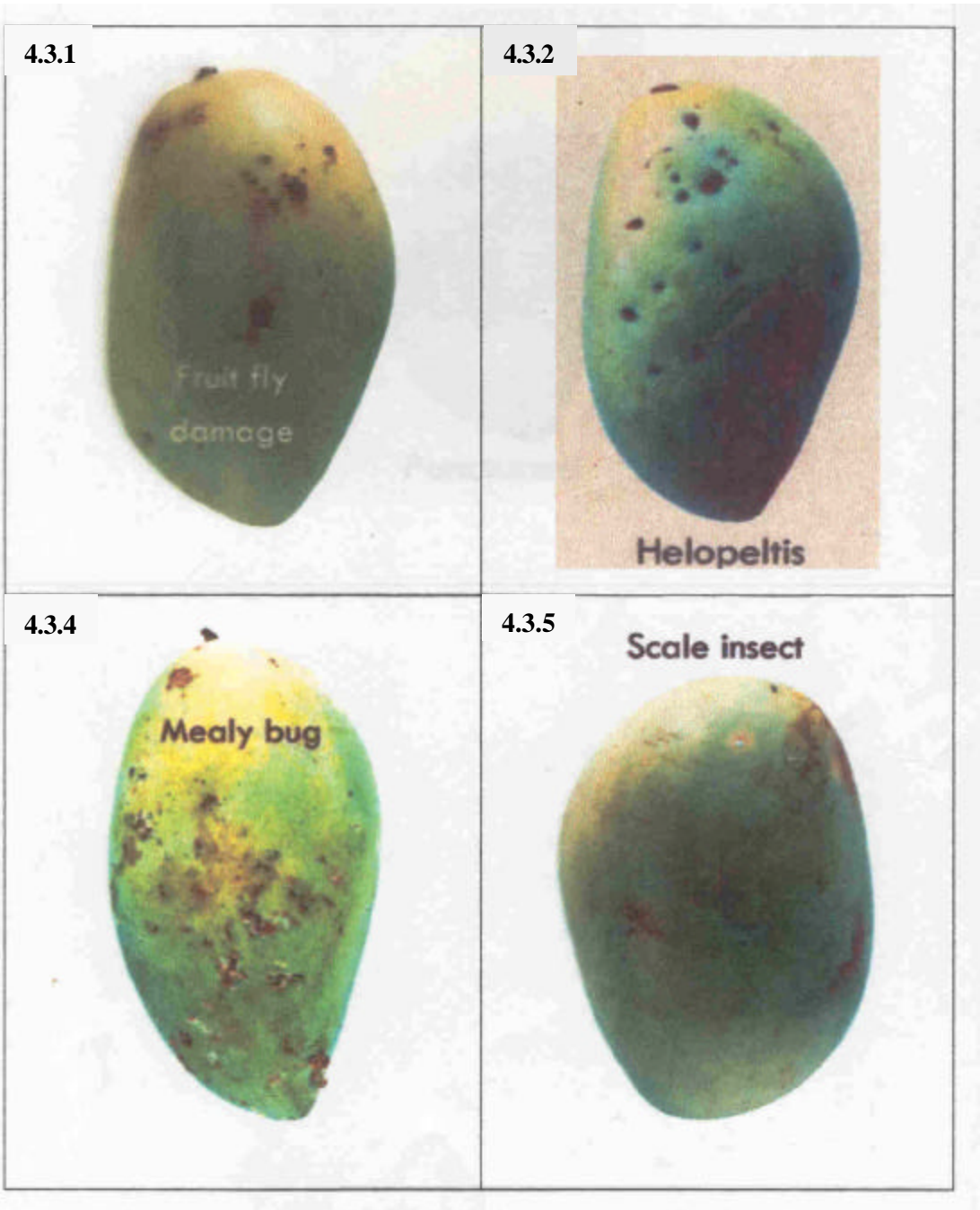
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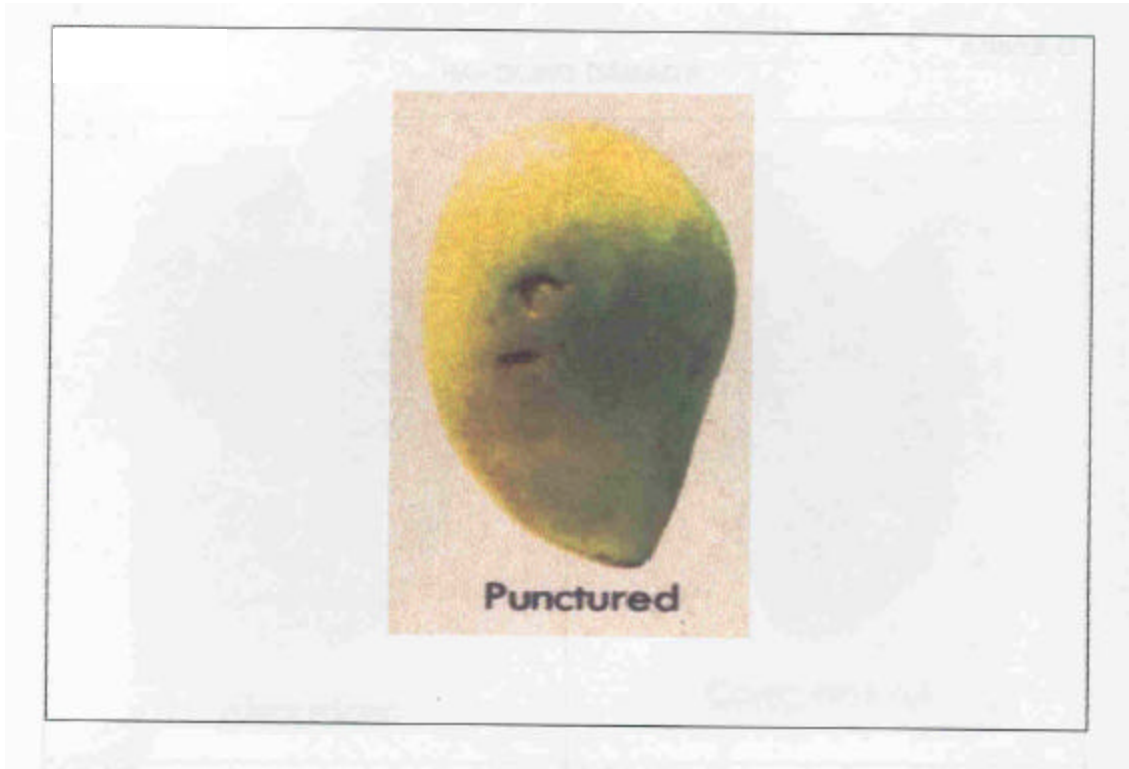
Pathological damage



Annex F

Insect and animal damage





Annex G

Handling damage

4.4.1



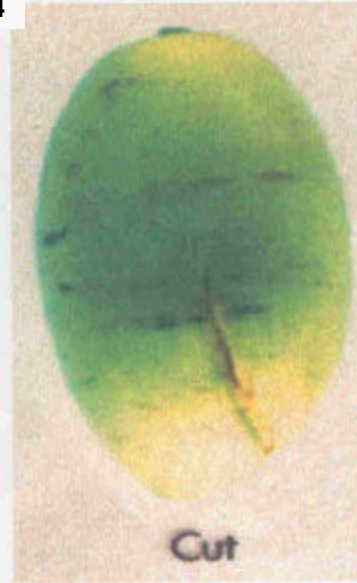
4.4.2



4.4.3



4.4.4



4.4.5



Latex burn

4.4.6



Latex stain

4.4.7



Lenticel spotting

Annex H**Heavy metals content of mango fruits**

Heavy metals	Maximum values (mg/kg)
Lead (Pb)	0.50
Cadmium (Cd)	0.05
Mercury (Hg)	0.03

Source: Organic Fruit and Vegetables from the Tropics. United Nations. New York and Geneva, 2003. pp. 109-118.

Annex I

Pesticide residues in mango fruits

Pesticides	MRL (mg/kg)
Carbendazin	2.0
Prochloraz	2.0 Po
Propiconazole	0.05
Triadimefon	0.1 (*)
* At or about the limit of determination. Po The MRL accommodates post-harvest treatment of the commodity.	
Source: Pesticide residues in food, 1993. Joint FAO/WHO Food Standards Programme. Codex Alimentarius Supplement One to Volume Two. Codex Alimentarius Commission. United Nations. World Health Organization.	

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