



FRESH FRUIT - MANGOES - SPECIFICATION

PNS/BAFPS 13:2004

ILLUSTRATIVE GUIDE





Fresh Fruits - Mangoes - Specification
(PNS/BAFPS 13:2004)

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Introductory Note

For years, the Department of Agriculture – Bureau of Agriculture and Fisheries Standards (DA-BAFS) developed Philippine National Standards (PNS), i.e. end-product quality standards, codes of practices, and guidelines, for agriculture and fishery products including agri-fishery machineries, tools and equipment. To date, DA-BAFS has developed a total number of 307 PNS for agriculture and fishery (AF) products, tools, machinery, equipment, and structures.

Disseminating information on adopted standards was identified as one of the strategies to encourage stakeholders' usage and implementation. In order to do this effectively, the standards developed need to be translated into Knowledge Products (KP) that will be easily understood by the intended stakeholders. One of the KPs is the Illustrative Guide (IG).

IG serves as a supplementary PNS learning material aside from the usual learning and development activities conducted by the Bureau, i.e. seminars, workshops and trainings. Through this IG, it is envisioned that stakeholders will have uniform understanding and interpretation of the PNS for its efficient adoption and implementation.

The development of IG for PNS/BAFPS 13:2004 Fresh Fruits – Mangoes – Specification was initiated in 2020. PNS/BAFPS 13:2004 was drafted in view of the increasing demand of mango for the domestic and export markets. Specifically, this IG for Mangoes provides supplementary photographs or images pertaining to some provisions of the end-product quality standard for mango. The photographs/ images included in the document were either taken by the Technical Services Division (TSD) staff through field work, obtained from the internet, or provided by the Technical Working Group (TWG) members from the academe, government institutions and private sector organizations. To ensure that the IG is technically accurate, a series of TWG meetings were conducted.

Director's Message



We value broad collaboration in order to deliver the right resources for sustainable learning solutions at the right time. On this note, as part of BAFS' efforts in standards promotion, we are pleased to share with you this Illustrative Guide (IG), which would serve as a supplementary learning material of the Philippine National Standards for Fresh Fruit – Mangoes – Specifications (PNS/BAFPS 13:2004).

This document was likewise drafted in support of the Philippine Mango Industry Roadmap (2017-2022) as part of the Department of Agriculture – High Value Crops Development Program (DA-HVCDP) Priority Crops in achieving its goal of revitalizing and strengthening the industry.

Positively, this Guide will aid the Philippine mango industry especially our farmers, in ensuring the quality of mangoes intended not only for the domestic markets but for export as well.

As the only standard setting agency for agricultural crops, the Bureau will unceasingly intensify its PNS information dissemination activities by incessantly developing illustrative guides and other knowledge products to broaden the cognizance of the stakeholders.

A handwritten signature in black ink, appearing to read 'MYER G. MULA', with a stylized flourish extending from the end.

MYER G. MULA, Ph.D.

OIC Director

Bureau of Agriculture
and Fisheries Standards

Assistant Director's Message



Studies have shown that adding an image to a teaching or presentation has proven to increase information retention from 10% to 65%.

Banking on these studies, the BAFS embarked on developing Illustrative Guides (IG) as a significant tool to support the learning of targeted stakeholders, and increase their understanding and appreciation of adopted standards. Through

the IG, we are confident that the level of adoption and usage of adopted standards will increase.

This IG for Mangoes is a compendium of photos gathered from years of study and field data gathering by our partners in the academe and private sectors. Our stakeholders can easily walk through the provisions of the standard now with the aid of photographs. Even the consumers will now become aware with the minimum requirements and classifications of mango varieties, and will also be conversant on matters concerning its various defects.

We intend to make learning more interactive by offering access (IG) to these opportunities that would significantly broaden one's intellectual horizons.

Mary Grace R. Mandigma
MARY GRACE R. MANDIGMA

Assistant Director
Bureau of Agriculture
and Fisheries Standards

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Scope

This standard established 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.

Varieties

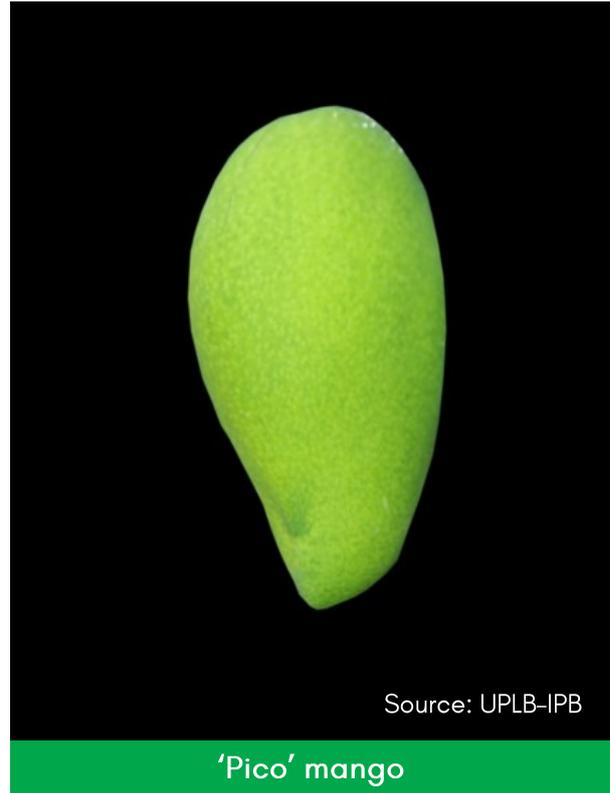
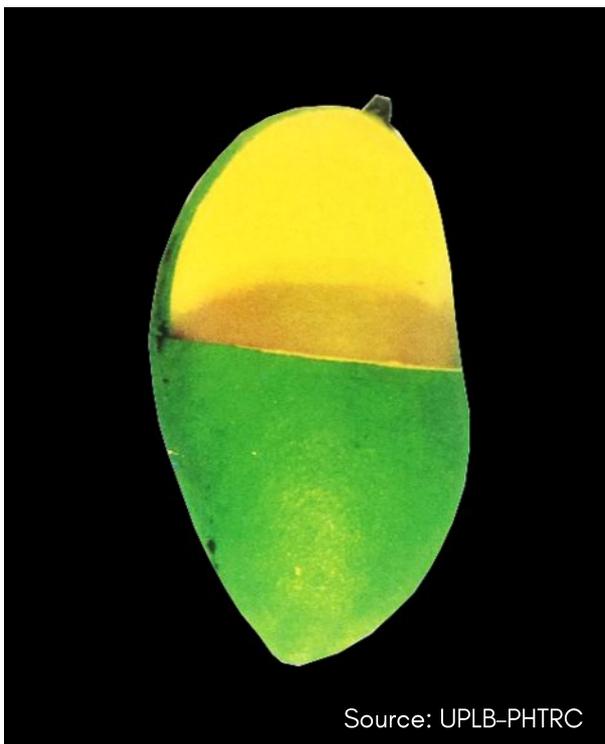


Table 1. Characteristics per variety

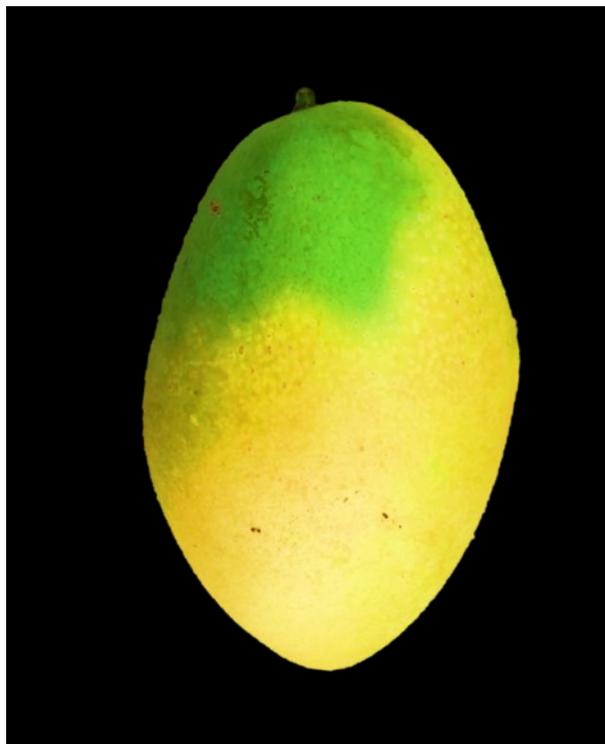
Characteristics	'Carabao' mango	'Pico' mango
Fruit Size	Relatively large	Relatively small
Fruit Weight	199 to ≥ 350 grams	100 to ≥ 300 grams
Fruit Shape	Oblong with blunt apex, full cheeks and indistinct beak	Asymmetric with rounded apex and distinct beak; More slender than 'Carabao' mango
Peel	Smooth and bright yellow when ripe; have delicate aroma	Smooth, orange yellow, thick and tough when ripe
Flesh	Golden yellow when ripe, very tender with delicate, aromatic non-turpentine flavor, exquisite sub-acid taste	Yellow-orange, tender, richer and sweeter than 'Carabao' mango but lacks delicate aroma of 'Carabao' mango
Fiber	Medium coarse but confined entirely to the edges of the stone	Fine, short and confined entirely to the edges of the stone
Commercial Purpose	For international trade and domestic markets (fresh and processed); branded as "Philippine Super Mango"	For domestic market (fresh and processed)

The following are the defects incurred prior to the harvest period and which are primarily due to physiological and environmental factors:



Source: UPLB-PHTRC

'Balat-kawayan' (Evergreen) at the ripe stage



Discoloration at mature green stage



Heat injury



Source: UPLB-PHTRC

Misshapen



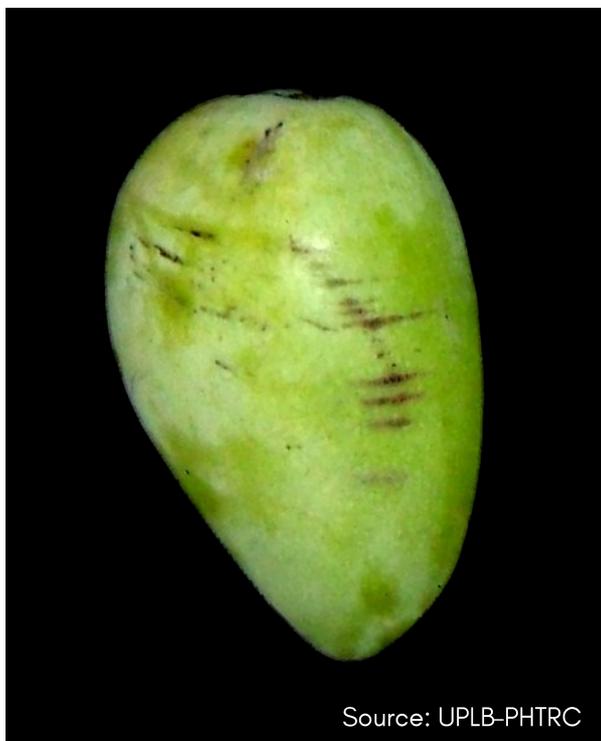
Source: UPLB-PHTRC

'Intul-tol'



Source: UPLB-PHTRC

'Ugat'



Source: UPLB-PHTRC

Windscar

The following are incurred due to animal damage and insect infestation:



Source: UPLB-PHTRC

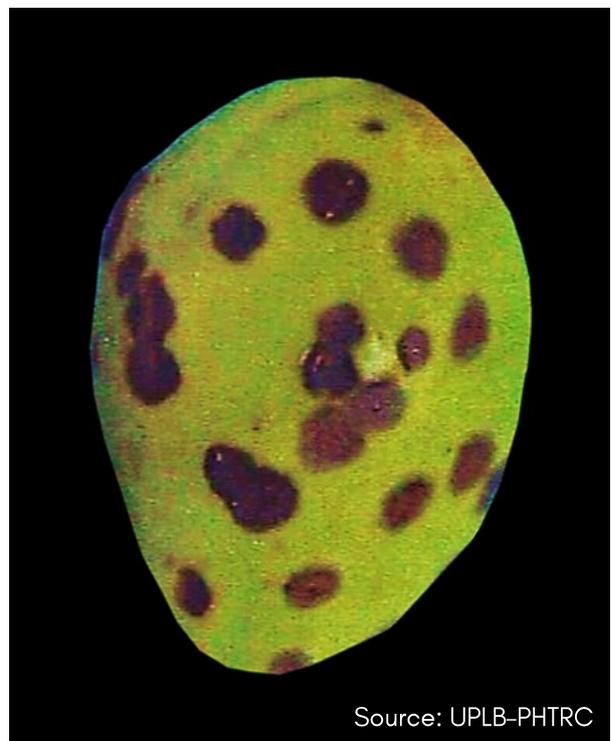
Source: UPLB-PHTRC

Fruit fly damages (pinholes)



Source: BPI-GNCRDPSC

Cecid fly damage

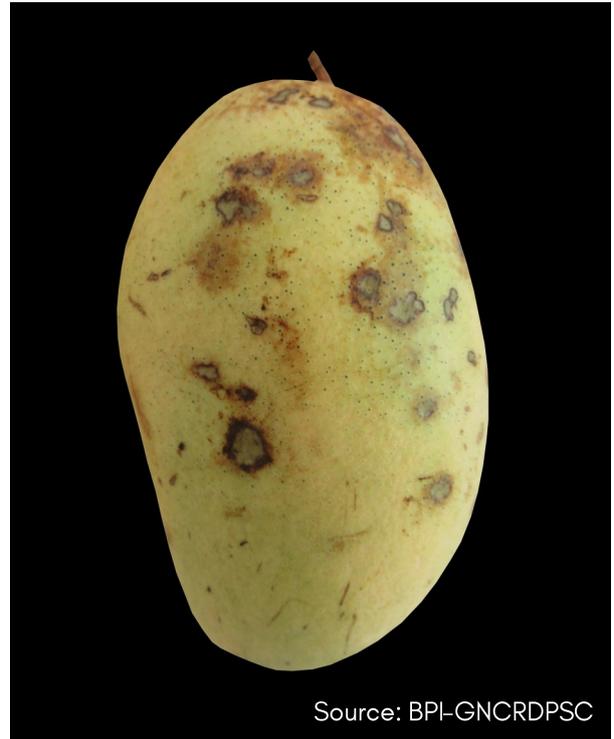


Source: UPLB-PHTRC

Helopeltis damage

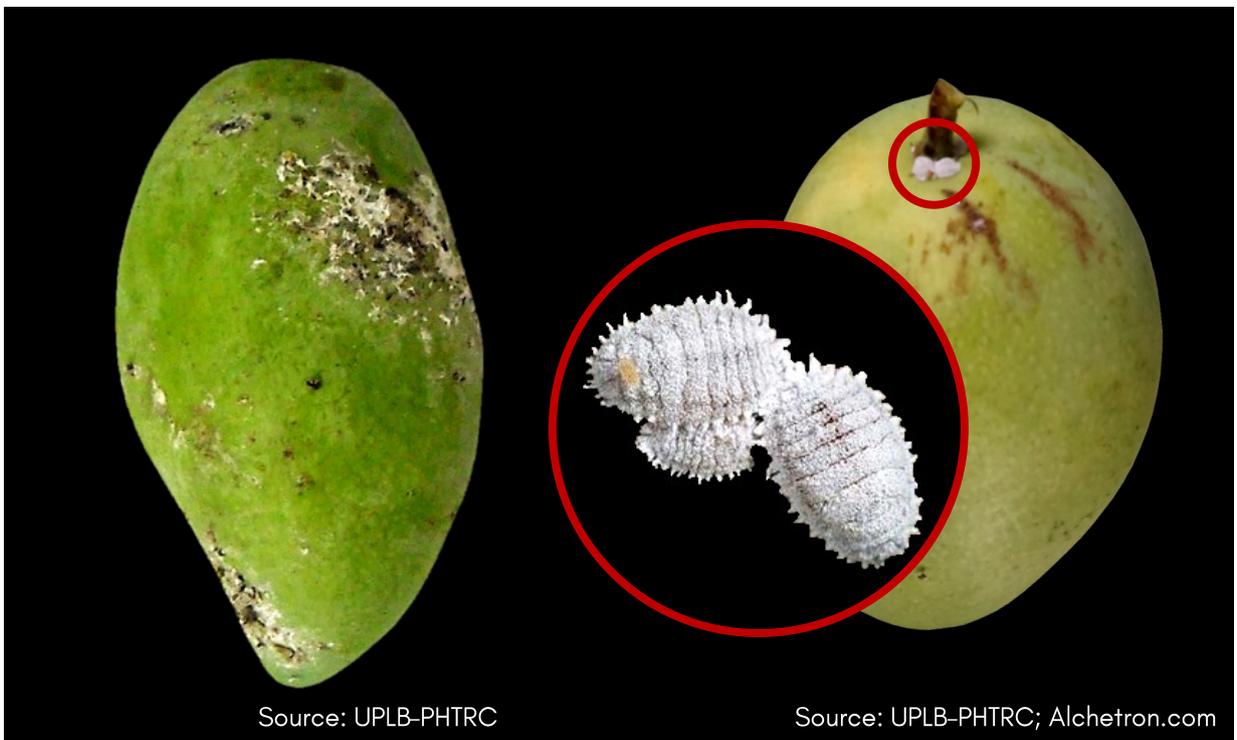


Animal injury



Source: BPI-GNCRDPSC

Urine injury due to black ants

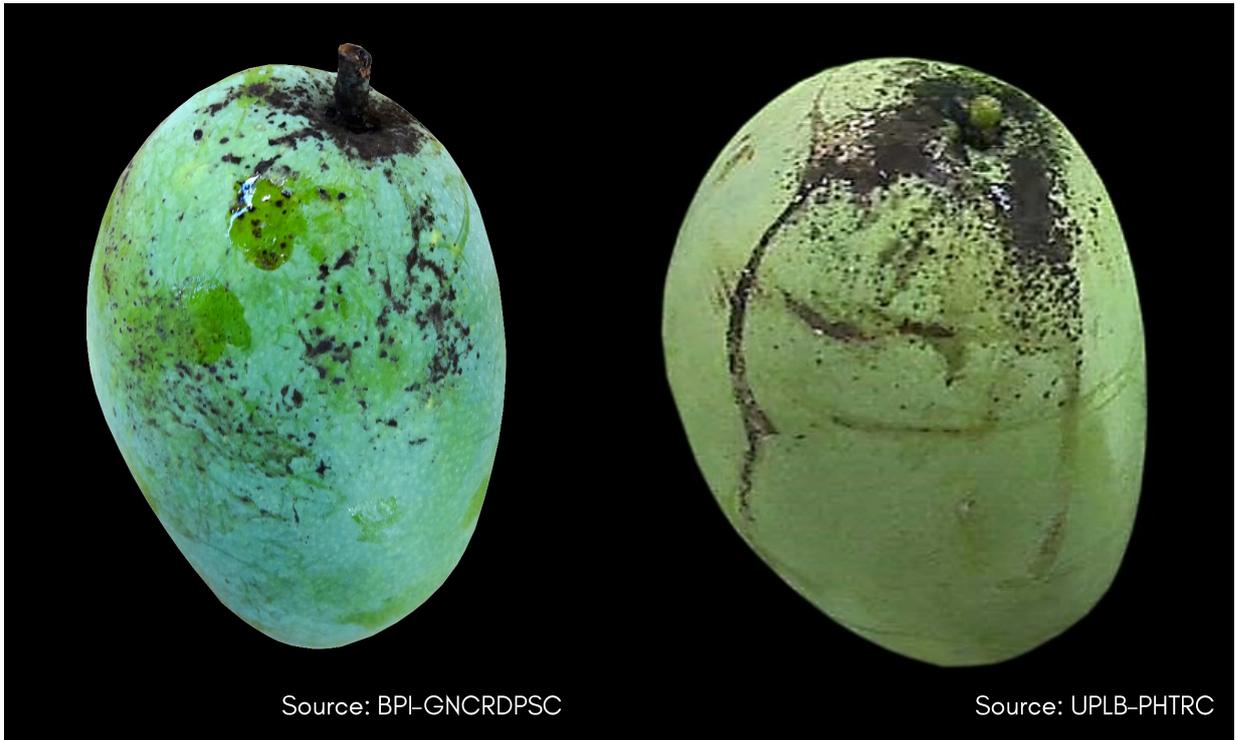


Source: UPLB-PHTRC

Source: UPLB-PHTRC; Alchetron.com

Mealy bug damage

The following are the damages due to infection of microorganisms:



Source: BPI-GNCRDPSC

Source: UPLB-PHTRC

Sooty mold

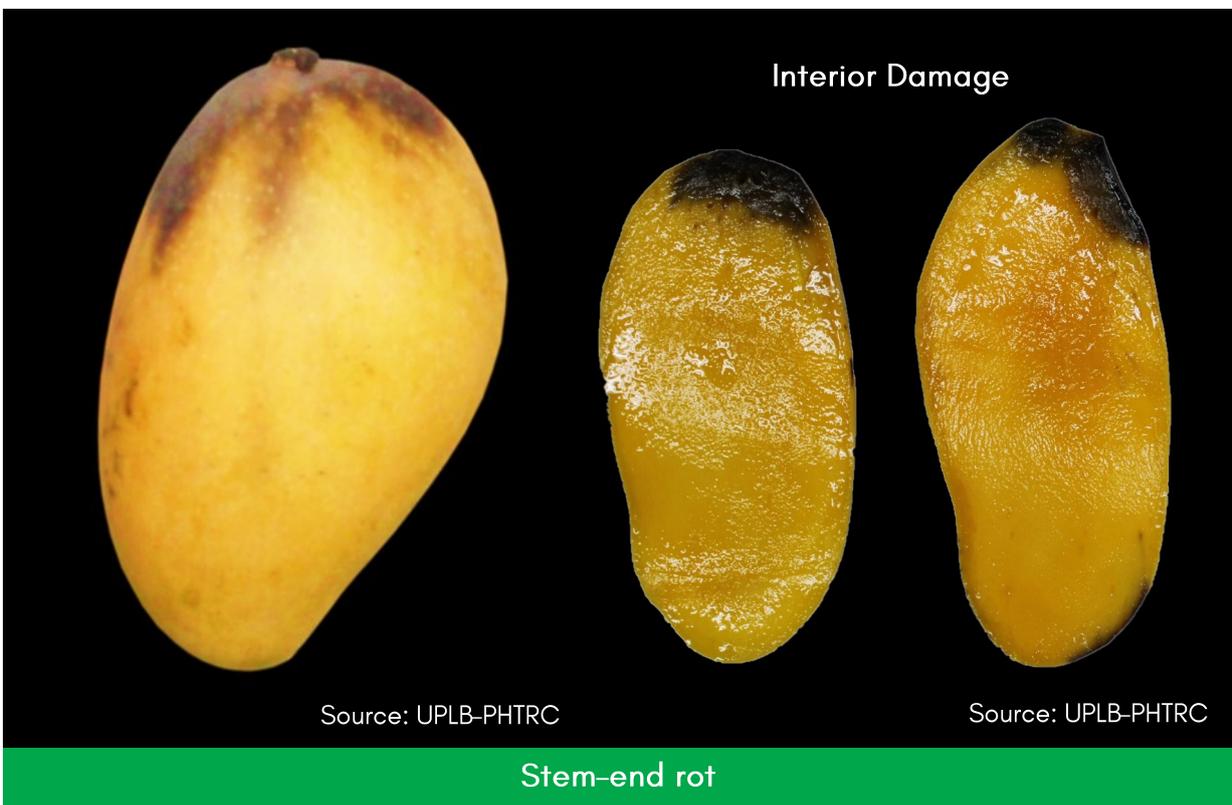


Source: BPI-GNCRDPSC

Source: UPLB-PHTRC

Scab

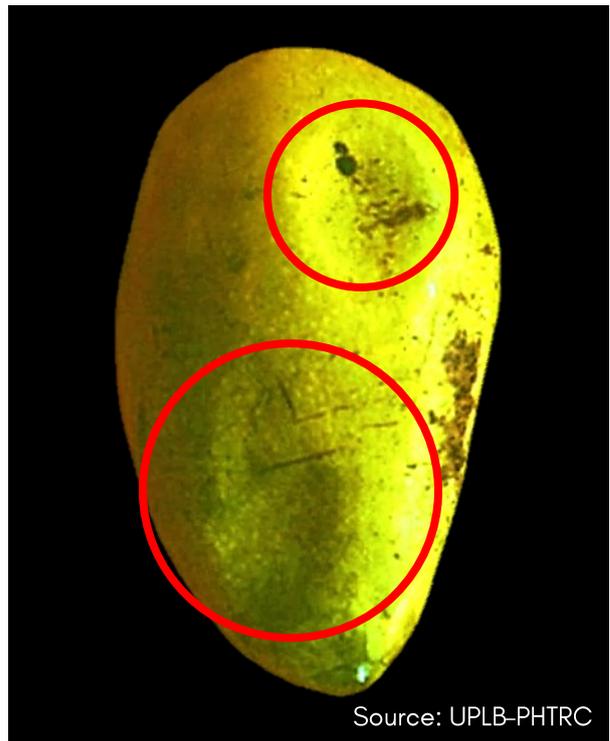
The following are the diseases of pre-harvest origin and with symptoms that become apparent as the fruits ripen (latent infection):



The following are the damages incurred due to improper handling of harvested mangoes:



Abrasion



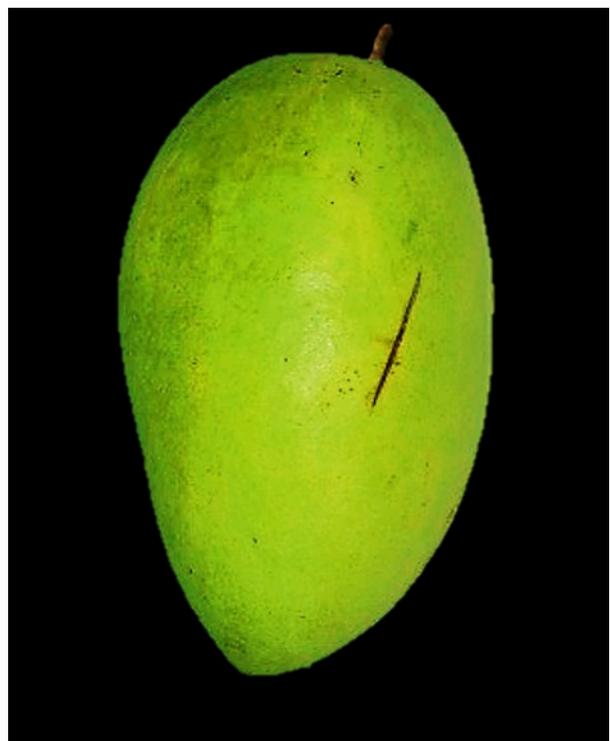
Source: UPLB-PHTRC

Compression



Source: UPLB-PHTRC

Cracked



Cut



Source: UPLB-PHTRC

Latex injury

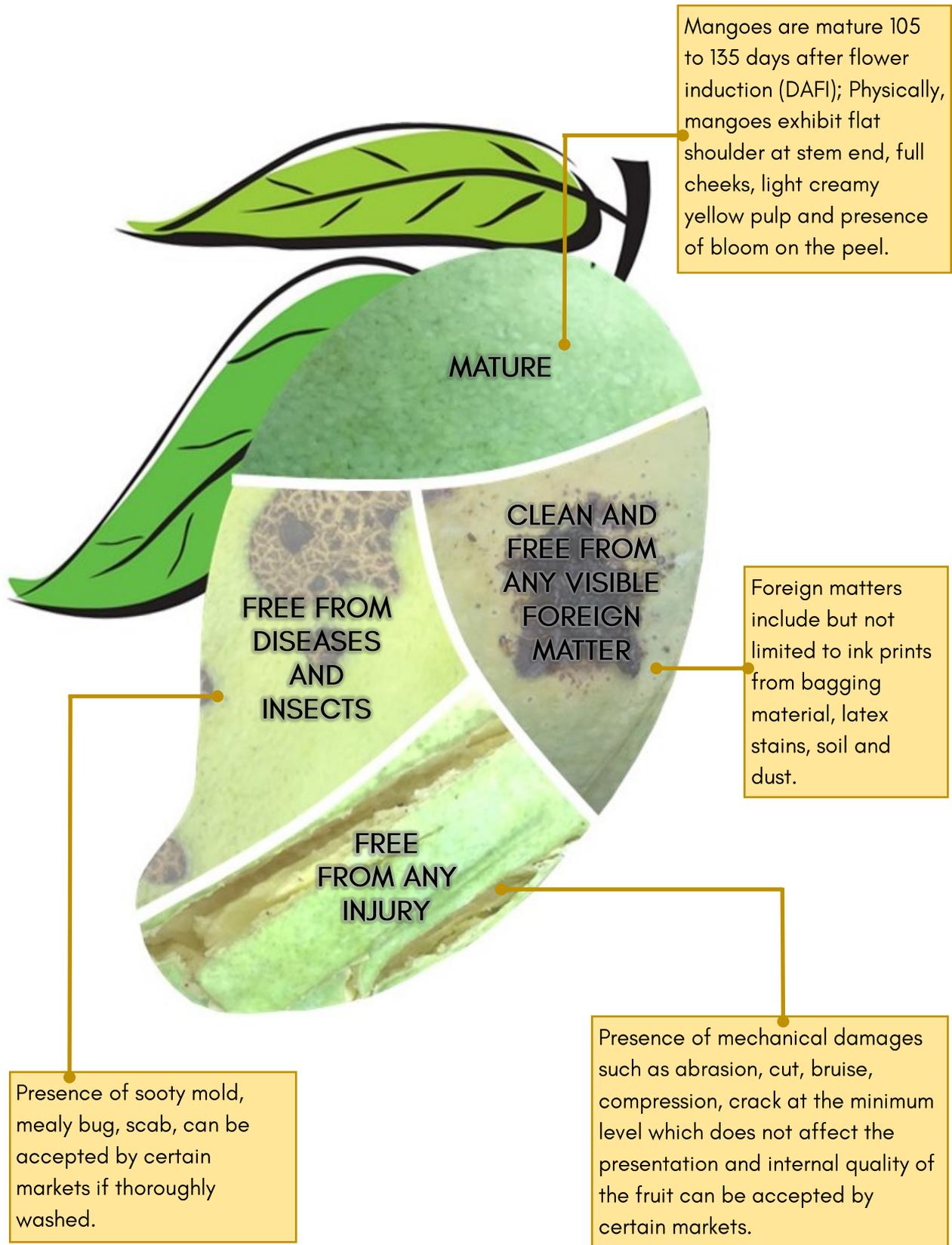


Source: UPLB-PHTRC

Latex stain



Lenticel spotting



Mango shall be graded according to its general appearance, keeping quality and condition.



Table 2. Characteristics of mango per classification

Criteria	Extra Class	Class I	Class II
Quality	Superior and of similar varietal characteristics	Good and have the characteristics of the variety	Satisfy the requirement of class II
Fruits	Mature, clean, well-trimmed, well-formed, smooth and free from pre-harvest defects and defects associated with insects, diseases and handling with exception of very slight superficial defects, provided that these defects do not affect the general appearance of the produce keeping quality and presentation in the package	Mature, clean, well-trimmed, well-formed, smooth and free from pre-harvest defects and defects associated with insects, diseases and handling with exception of very slight superficial defects, do not affect the general appearance of the produce	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

Table 3. Size classification of green 'Carabao' mango according to its weight

Size	Weight (g) per fruit	Number of pieces/carton box			
		2.5 kg - box	5.0 kg - box	10 kg - box	12.0 kg - box
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

Table 4. Size classification of 'Pico' mango according to its weight

Size	Weight (g) per fruit
Extra large	> 300
Large	251 - 300
Medium	201 - 250
Small	151 - 200
Super small	>100 - 150

Mangoes shall be packed in suitable containers that will avoid causing any external or internal damage to the produce.

Suitable container for harvesting and transport



Plastic crate



Source: UPLB-IPB

Bamboo or rattan baskets ('kaing') with liner



Source: UPLB-PHTRC

Wooden crate with liner

Suitable container for selling



Source: GMGPDC

Packaging box for local market



Source: UPLB-IPB

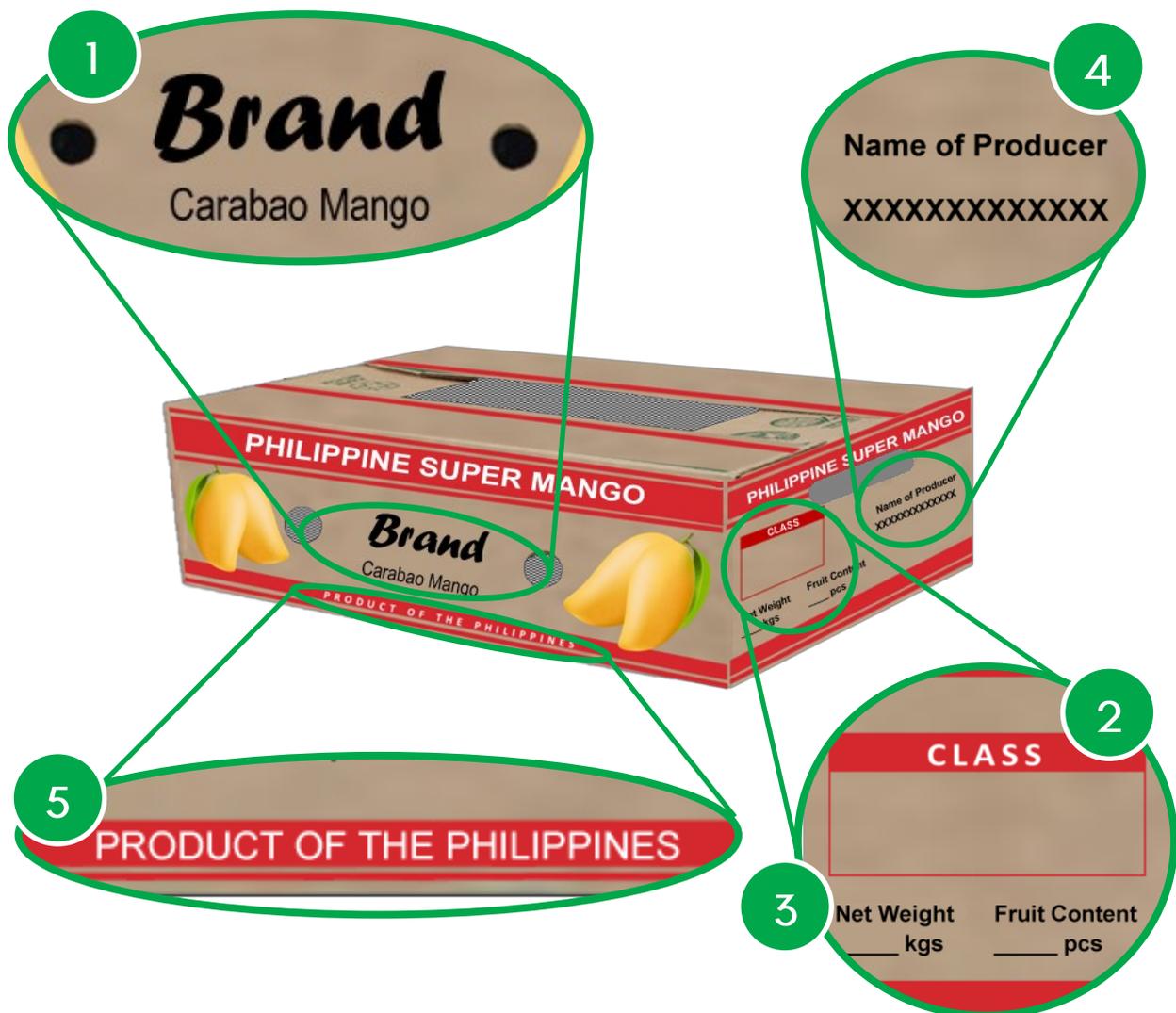
Source: UPLB-IPB

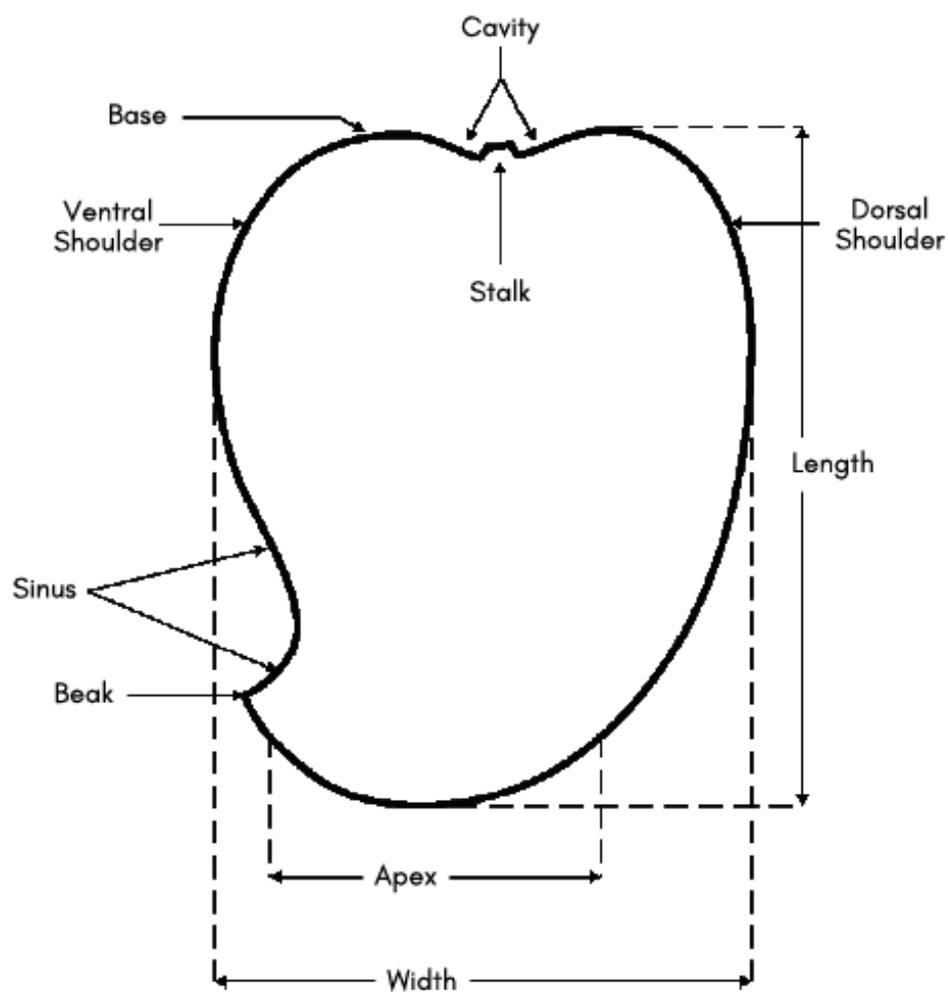
Packaging box for export market

Each container shall be legibly labeled on the same side with the following information:

1. Name of the product, the variety and/or commercial type
2. Grade and size and/or number of pieces
3. Net weight in kilograms
4. Name of producer and exporter
5. The words "Product of the Philippines"

Example of labelled box for export





Source: ITFNET

Parts of a mango fruit

DOCUMENT REFERENCES

Bureau of Agriculture and Fisheries Standards (2004). PNS/BAFPS 13:2004 - Fresh Fruit - Mangoes - Specification.

Bureau of Agriculture and Fisheries Standards (2009). PNS/BAFPS 45:2009 - Code of Good Agricultural Practices for Mango.

PHOTO REFERENCES

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[Untitled image of fruiting mango tree cited]. (n.d.). Retrieved from Tropical Reserves & Economical Education at <https://www.treecenter.info/eecenter.info/2014/05/representing-philippines-is-mango-tree.html>

Page 1 (Left to right)

[Untitled image of carabao mango cited]. (n.d.). Retrieved from University of the Philippines - Los Baños - Postharvest Horticulture Training and Research Center (UPLB-PHTRC)

[Untitled image of pico mango cited]. (n.d.). Retrieved from University of the Philippines - Los Baños - Institute of Plant Breeding (UPLB-IPB)

Page 3 (Left to right; top to bottom)

[Untitled image of "balat-kawayan"/evergreen mango defect cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of misshapen mango defect cited]. (n.d.). Retrieved from UPLB-PHTRC

Page 4 (Left to right; top to bottom)

[Untitled image of "intul-tol" mango defect cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of "ugat" mango defect cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of "windscar" mango defect cited]. (n.d.). Retrieved from UPLB-PHTRC

Page 5 (Left to right; top to bottom)

[Untitled image of fruit fly mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of fruit fly mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of cecid fly mango damage cited]. (n.d.). Retrieved from BPI-GNCRDPSC

[Untitled image of helopeltis mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

Page 6 (Left to right; top to bottom)

[Untitled image of urine injury due to black ants cited]. (2018). Retrieved from BPI-GNCRDPSC

[Untitled image of mealy bug mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of mealy bug mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of mealy bug insects cited]. (2018). Retrieved from Alchetron at <https://alchetron.com/Mango-mealybug>

Page 7 (Left to right; top to bottom)

[Untitled image of sooty mold mango damage cited]. (n.d.). Retrieved from Bureau of Plant Industry—Guimaras National Crop Research Development and Production Support Center (BPI-GNCRDPSC)

[Untitled image of sooty mold mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of scab mango damage cited]. (n.d.). Retrieved from BPI-GNCRDPSC

[Untitled image of scab mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

Page 8 (Left to right; top to bottom)

[Untitled image of anthracnose mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of stem-end rot damage cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of stem-end rot mango internal damage cited]. (2018). Retrieved from UPLB-PHTRC

Page 9 (Left to right; top to bottom)

[Untitled image of compression mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of cracked mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

Page 10 (Left to right; top to bottom)

[Untitled image of latex injury mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

[Untitled image of latex stain mango damage cited]. (n.d.). Retrieved from UPLB-PHTRC

Page 12 (Left to right)

[Untitled image of extra class mango cited]. (n.d.). Retrieved from BPI-GNCRDPSC

[Untitled image of class I mango cited]. (2017). Retrieved from BPI-GNCRDPSC

[Untitled image of class II mango cited]. (2018). Retrieved from BPI-GNCRDPSC

Page 14 (Left to right; top to bottom)

[Untitled image of mangoes in kaings with liners cited]. (n.d.). Retrieved from UPLB-IPB

[Untitled image of mangoes in wooden crate with liners cited]. (n.d.). Retrieved from UPLB-PHTRC

Page 15 (Left to right; top to bottom)

[Untitled image of mangoes in packaging box cited]. (n.d.). Retrieved from Guimaras Mango Growers & Producers Development Coop. (GMGPDC), San Miguel, Jordan, Guimaras

[Untitled image of mangoes in packaging box cited]. (n.d.). Retrieved from UPLB-IPB

[Untitled image of mangoes in packaging box with foam cited]. (n.d.). Retrieved from UPLB-IPB

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Mango fruit [Diagram]. (2016). Retrieved from International Tropical Fruits Network at <https://www.itfnet.org/v1/2016/05/mango-name-taxonomy-botany-2/>

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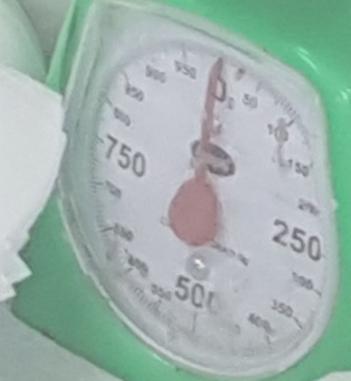
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