



## EAST AFRICAN STANDARD

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### Fresh baby corn — Specification and grading



**EAST AFRICAN COMMUNITY**

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HS 0709.90.00 [HS 0709.90.4070]

## Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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## Introduction

In the preparation of this East African Standard, the following sources were consulted extensively:

CODEX STAN 188:1993 (Rev. 2005), *Standard for Baby Corn*

*United States Standards for Grades of Sweet Corn*, Effective February 12, 1992 (Reprinted January 1997)

CODEX STAN 193:1995 (Rev.5:2009), *General Standard for Contaminants and Toxins in Foods*

CODEX STAN 228:2001 (Rev.1:2004), *General methods of analysis for contaminants*

Codex Alimentarius website: [http://www.codexalimentarius.net/mrls/pestdes/jsp/pest\\_q-e.jsp](http://www.codexalimentarius.net/mrls/pestdes/jsp/pest_q-e.jsp)

USDA Foreign Agricultural Service website: <http://www.mrldatabase.com>

USDA Agricultural Marketing Service website: <http://www.ams.usda.gov/AMSV1.0/Standards>

USDA Plant Inspectorate Service website: [http://www.aphis.usda.gov/import\\_export/plants](http://www.aphis.usda.gov/import_export/plants)

European Union: [http://ec.europa.eu/sanco\\_pesticides/public](http://ec.europa.eu/sanco_pesticides/public)

Assistance derived from these sources and others inadvertently not mentioned is hereby acknowledged.

This standard has been developed to take into account:

- the needs of the market for the product;
- the need to facilitate fair domestic, regional and international trade and prevent technical barriers to trade by establishing a common trading language for buyers and sellers.
- the structure of the CODEX, UNECE, USA, ISO and other internationally significant standards;
- the needs of the producers in gaining knowledge of market standards, conformity assessment, commercial cultivars and crop production process;
- the need to transport the product in a manner that ensures keeping of quality until it reaches the consumer;
- the need for the plant protection authority to certify, through a simplified form, that the product is fit for crossborder and international trade without carrying plant disease vectors;
- the need to promote good agricultural practices that will enhance wider market access, involvement of small-scale traders and hence making fruit and vegetable production a viable means of wealth creation; and
- the need to keep unsatisfactory produce from the market by allowing the removal of unsatisfactory produce from the markets and to discourage unfair trade practices e.g. trying to sell immature produce at the beginning of the season when high profits can be made. Immature produce leads to dissatisfaction of customers and influences their choices negatively, which disadvantages those traders who have waited until the produce is mature.

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## Fresh baby corn — Specification and grading

### 1 Scope

This Standard applies to the cobs, without the silk and anthers, of commercial varieties of baby corn (corn inflorescence) grown from *Zea mays L.*, of the *Gramineae* family, separated from silk, husk and anthers, to be supplied fresh to the consumer, after preparation and packaging. Baby corn for industrial processing is excluded.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CAC/GL 21, *Principles for the Establishment and Application of Microbiological Criteria for Foods*

CAC/RCP 1, *Recommended International Code of Practice — General Principles of Food Hygiene*

CAC/RCP 44, *Recommended International Code of Practice for the Packaging and Transport of Tropical Fresh Fruit and Vegetables*

CAC/RCP 53, *Code of Hygienic Practice for Fresh Fruits and Vegetables*

EAS 38, *Labelling of prepackaged foods — Specification*

CD/K/378:2010, *Horticultural industry — Code of practice*

### 3 Definitions

For the purpose of this standard the following definition shall apply:

#### 3.1

##### **similar varietal characteristics**

the ears in any package have similar kernel colour and character of growth. Ears of field corn and sweet corn, or ears having white colour kernels, yellow colour kernels and mixed colour kernels of corn, shall not be mixed.

#### 3.2

##### **well trimmed**

the ears are practically free from loose husks and that the shank shall be not more than 152.4 mm in length and not extend more than 25.4 mm beyond the point of attachment of the outside husk

#### 3.3

##### **well developed**

the ears are fairly straight and are not stunted. Nubbins are not well developed ears

#### 3.4

##### **insect or worm injury**

insect or worm frass (the fine powdery material phytophagous (plant-eating) insects pass as waste after digesting plant parts) is present, or there is visible evidence of insect or worm injury

#### 3.5

##### **injury**

any defect listed in Annex A or any defect which more than slightly affects the appearance, or the edible or shipping quality of the ear. Any one of the following defects, or any combination of defects, the seriousness of which exceeds the maximum allowed for any one defect, shall be considered as injury:

## CD/K/027:2010

- (1) Rust when the aggregate area on the husk exceeds one square inch (645.2mm<sup>2</sup>), or when the rust extends deeper than 2 layers of husks; and
- (2) Discoloration caused by frost or sprayburn, or similar types of discoloration when affecting an aggregate area of more than 3 square inches (1935.5mm<sup>2</sup>) on the husk, or when exceeding an aggregate area of 25 percent of the surface of all blades.

### 3.6

#### **fairly well filled**

the rows of kernels show fairly uniform development, and that the appearance and quality of the edible portion of the ear are not materially affected by poorly developed rows. When the ear has not been clipped, not more than one-fourth of the length of the cob may have poorly developed or missing kernels at the tip. When the ear has been clipped, it shall have practically no poorly developed kernels at the tip of the cob. Missing or poorly developed kernels on other parts of the ear shall not aggregate more than one square inch (645.2mm<sup>2</sup>) on a cob 6 inches (152.4 mm) in length, and a proportionally greater area shall be permitted on a longer cob and a proportionally lesser area on a shorter cob.

### 3.7

#### **plump and milky**

the kernels are well developed and the contents have a milky, creamy, or clear jelly-like consistency

### 3.8

#### **well covered**

the husk enclosing the ear is tight and undisturbed, except that a slight opening may have been made at the tip, provided that the disturbed part has been properly replaced so that the appearance of the ear is not more than slightly affected

### 3.9

#### **fresh**

the husks have fairly good green colour and are not badly wilted

### 3.10

#### **husked**

on the full length of the cob the equivalent of at least 3 rows of kernels are exposed up to the entire cob

### 3.11

#### **well clipped**

one or both ends of the cob, or one or both ends of the cob and husk have been neatly removed approximately at a right angle to the longitudinal axis

### 3.12

#### **properly trimmed**

the ear is not damaged by loose husks and silks and that the shank shall not extend more than 1 inch (25.4 mm) from the cob, when present

### 3.13

#### **damage**

any defect listed in Annex A or any defect which materially affects the appearance, or the edible or shipping quality of the ear. Any one of the following defects, or any combination of defects, the seriousness of which exceeds the maximum allowed for any one defect, shall be considered as damage:

- (1) Discoloration caused by frost or sprayburn, or similar types of discoloration when affecting an aggregate area of more than 5 square inches (3225.8 mm<sup>2</sup>) on the husk, or when exceeding an aggregate area of 50 percent of the surface of all blades; and,
- (2) Worm injury on unclipped ears when extending more than 1-1/2 inches (38.1 mm) from the tip on an ear 6 inches (152.4 mm) in length (proportionately greater or lesser amounts permitted on longer or shorter ears, respectively), or when affecting the kernels on other parts of the ear or any worm injury on clipped ears.

**3.14****fairly well covered**

the husk enclosing the ear is fairly tight and undisturbed except that an opening may have been made at the tip, provided that the disturbed part has been properly replaced so that the appearance of the ear is not materially affected

**3.15****properly clipped**

the tip end of the cob, or the tip end of the cob and husk have been neatly removed approximately at a right angle to the longitudinal axis

**3.16****fairly well trimmed**

the appearance of the individual ear of corn is not seriously affected by loose husks and that the shank shall not be more than 6 inches (152.4 mm) in length and not extend more than 2 inches (50.8 mm) beyond the point of attachment of the outside husk

**3.17****fairly well developed**

the ears are not stunted to the extent that the appearance is seriously affected

**3.18****serious damage**

any defect listed in Annex A or any defect which seriously affects the appearance, or the edible or shipping quality of the ear. The following defects or any combination of defects, the seriousness of which exceeds the maximum allowed for any one defect, shall be considered as serious damage:

- (1) Worm injury on unclipped ears when extending more than 50.8 mm from the tip on an ear 152.4 mm in length (proportionately greater or lesser amounts permitted on longer or shorter ears, respectively), or when affecting more than 4 kernels on other parts of the cob, or any worm injury on clipped ears extending more than 6.4 mm from the tip.

**3.19****moderately filled**

the rows of kernels show fairly uniform development, and that the appearance and quality of the edible portion of the ear are not seriously affected by poorly developed rows. When the ear has not been clipped, more than one-fourth but less than one-third of the length of the cob has poorly developed or missing kernels at the tip. When the ear has been clipped it shall have not more than a slight amount of poorly developed kernels at the tip of the cob. Missing or poorly developed kernels on other parts of the ear shall not aggregate more than 806.5mm<sup>2</sup> on a cob 152.4 mm in length, and proportionally greater area shall be permitted on a longer cob and a proportionally lesser area on a shorter cob.

**3.20****poorly filled**

the edible quality or appearance is affected to a greater extent than that of an ear 152.4 mm in length which has one-third of the cob at the tip end and aggregate area 967.7 mm<sup>2</sup> on other portions of the ear with undeveloped kernels or open spaces; and means, on clipped ears, that the edible quality or appearance is affected to a greater extent than that of an ear 152.4 mm in length which has 25.4 mm at the tip end and an aggregate area 967.7 mm<sup>2</sup> on other portions of the ear with undeveloped kernels or open spaces.

**4 Provisions concerning quality****4.1 General**

The purpose of the standard is to define the quality requirements of the cobs of baby corn at the export control stage, after preparation and packaging.

## 4.2 Minimum requirements

4.2.1 In all classes, subject to the special provisions for each class and the tolerances allowed, the cobs of baby corn must be:

- (a) whole;
- (b) sound, produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;
- (c) clean, practically free of any visible foreign matter;
- (d) free of damage caused by pests;
- (e) free of abnormal external moisture;
- (f) free of any foreign smell and/or taste;
- (g) fresh in appearance;
- (h) practically free of silk.

The cut that is made on the base of the cobs should be clean and well defined. A slight discolouration of the cut surface due to storage is acceptable.

4.2.2 The development and condition of the baby corn must be such as to enable it:

- (a) to withstand transport and handling; and
- (b) to arrive in satisfactory condition at the place of destination.

## 4.3 Classification

The cobs of baby corn are classified in three classes defined below:

### 4.3.1 "Extra" Class

The cobs of baby corn in this class must be well trimmed, free of husk, stalk and silk, intact and of superior quality. They must be characteristic of the variety and/or commercial type. They must be free of defects, with the exception of very slight superficial defects, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.

### 4.3.2 Class I

The cobs of baby corn in this class must be well trimmed, free of husk and stalk and of good quality. They must be characteristic of the variety and/or commercial type. The following slight defects, however, may be allowed, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package:

- slight defects in shape, colour and texture;
- slight defects in irregular arrangement of undeveloped kernels (ovules);
- slight defects on the surface due to bruising, scratches or other mechanical damage. The total area affected shall not exceed 5% per cob;
- silk attached to and/or broken from the cob shall be minimal without affecting the appearance.

### 4.3.3 Class II

This class includes cobs of baby corn which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified in 4.2. The following defects, however, may be allowed,

provided the cobs of baby corn retain their essential characteristics as regards the quality, the keeping quality and presentation:

- defects in shape, colour and texture;
- defects in irregular arrangement of undeveloped kernels (ovules);
- defects on the surface due to bruising, scratches or other mechanical damage. The total area affected shall not exceed 10 % per cob;
- silk attached to and/or broken from the cob shall be minimal without affecting the appearance.

## 5 Provisions concerning sizing

Size is determined by the length of the cob of baby corn, in accordance with the following table:

Size Code	Length (in centimetres)
A	5.0 - 7.0
B	7.0 - 9.0
C	9.0 - 12.0

For all sizes, the minimum width should not be less than 1.0 cm and the maximum width not more than 2.0 cm.

## 6 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.

### 6.1 Quality tolerances

#### 6.1.1 "Extra" Class

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

#### 6.1.2 Class I

Ten percent by number or weight of cobs of baby corn not satisfying the requirements of the class, but meeting those of Class II or, exceptionally, coming within the tolerances of that class.

In the case of cobs of baby corn with incompletely removed husk and stalk, only 5 per cent by number or weight of 0.5 cm long of the husk and stalk is allowed.

#### 6.1.3 Class II

Ten percent by number or weight of cobs of baby corn 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.

In the case of cobs of baby corn with incompletely removed husk and stalk, only 5% by number or weight of 0.5 cm long of the husk and stalk is allowed.

### 6.2 Size tolerances

For "Extra" Class, 5%; and for Class I or Class II 10%; by number or weight of cobs of baby corn not satisfying the requirements as regards sizing, but falling within the class immediately above or below those indicated in Clause 5.

## 7 Provisions concerning presentation

### 7.1 Uniformity

The contents of each package must be uniform and contain only cobs of baby corn of the same origin, quality and size. The visible part of the contents of the package must be representative of the entire contents.

### 7.2 Packaging

The cobs of baby corn must be packed in such a way as to protect the produce properly. The materials used inside the package must be new<sup>1</sup>, clean, and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly of paper or stamps bearing trade specifications is allowed, provided the printing or labelling has been done with non-toxic ink or glue.

The cobs of baby corn shall be packed in each container in compliance with CAC/RCP 44.

#### 7.2.1 Description of containers

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

## 8 Marking or labelling

### 8.1 Consumer packages

In addition to the requirements of EAS 38, the following specific provisions apply:

#### 8.1.1 Nature of Produce

If the produce is not visible from the outside, each package (or lot for produce presented in bulk) should be labelled as to the name of the produce and may be labelled as to name of the variety.

### 8.2 Non-retail containers

Each package must bear the following particulars, in letters grouped on the same side, legibly and indelibly marked, and visible from the outside, or in the documents accompanying the shipment. For produce transported in bulk, these particulars must appear on a document accompanying the goods.

#### 8.2.1 Identification

Name and address of exporter, packer and/or dispatcher. Identification code (optional).<sup>2</sup>

#### 8.2.2 Nature of Produce

Name of the produce if the contents are not visible from the outside. Name of the variety or commercial type (optional).

#### 8.2.3 Origin of Produce

Country of origin and, optionally, district where grown or national, regional or local place name.

<sup>1</sup> For the purposes of this Standard, this includes recycled material of food-grade quality.

<sup>2</sup> The national legislation of a number of countries requires the explicit declaration of the name and address. However, in the case where a code mark is used, the reference "packer and/or dispatcher (or equivalent abbreviations)" has to be indicated in close connection with the code mark.

### 8.2.4 Commercial Identification

- Class;
- Size (size code);
- Net weight (optional).

### 8.2.5 Official inspection mark (optional)

## 9 Contaminants

### 9.1 Heavy metals

The cobs of baby corn shall comply with those maximum levels for heavy metals established by the Codex Alimentarius Commission for this commodity. The current limits are as indicated below:

Metal	Unit of measurement	Maximum limit	Test method
Lead (Pb)	mg/kg wet weight	0.30	ISO 6633 (AAS)
Cadmium (Cd)	mg/kg wet weight	0.050	ISO 6561-1 or 6561-2

### 9.2 Pesticide residues

The cobs of baby corn shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity. The limits listed below were current as of the dates indicated. The table below provides current MRLs while Annex E provides current MRLs for the USA, EU and Codex markets.

#### Maximum pesticide residue limits and extraneous maximum residue limits in sweet (baby) corn (current as at 2009-09-09)

Type	Unit symbol	Limit	Method of test	Notes
<b>Sweet corn (corn-on-the-cob)</b>				
2,4-D	MRL (mg/kg) (*)	0.05		
CARBARYL	MRL (mg/kg)	0.1		
CHLOROTHALONIL	MRL (mg/kg) (*)	0.01		
CHLORPYRIFOS	MRL (undef) (*)	0.01		
CYPERMETHRIN	MRL (mg/kg)	0.05		
DELTA METHRIN	MRL (mg/kg) (*)	0.02		Used also as veterinary drug
DIAZINON	MRL (mg/kg)	0.02		
DIMETHENAMID-P	MRL (undef) (*)	0.01		
DISULFOTON	MRL (mg/kg) (*)	0.02		
DITHIOCARBAMATES	MRL (undef) (*)	0.1		Source of data: mancozeb
FENVALERATE	MRL (mg/kg)	0.1		
FLUDIOXONIL	MRL (undef) (*)	0.01		Interim MRL (2005-2009)
FLUSILAZOLE	MRL (mg/kg) (*)	0.01		
IMIDACLOPRID	MRL (mg/kg) (*)	0.02		
INDOXACARB	MRL (undef)	0.02		
MALATHION	MRL (undef)	0.02		
METHOXYFENOZIDE	MRL (undef) (*)	0.02		
PERMETHRIN	MRL (mg/kg)	0.1		
PROPICONAZOLE	MRL (undef)	0.05		
SPINOSAD	MRL (undef) (*)	0.01		
TERBUFOS	MRL (undef) (*)	0.01		
<b>Sweet corn kernels</b>				
DISULFOTON	MRL (mg/kg) (*)	0.02		
LINDANE	MRL (mg/kg) (*)	0.01		
PRIMICARB	MRL (undef)	0.05		
<b>Sweet corn cannery waste</b>				
CARBARYL	MRL (mg/kg)	7.4		

## 10 Hygiene

**10.1** It is recommended that the produce covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of CAC/RCP 1, CAC/RCP 53, and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

**10.2** The produce should comply with any microbiological criteria established in accordance with CAC/GL 21.



Baby corn without shell



Baby corn with shell



Fresh packaged baby corn



Immature baby corn in farm



Fresh baby corn



Baby corn in farm



Packaged baby corn

Draft for



Packaged baby corn

Draft for comments only — Not to be cited

**Annex A**  
(informative)

**Classification of defects**

Number of affected kernels allowed for the following defects:

**Table A.1 — Mechanical, bird<sup>1</sup>, disease, and indented kernels**

Length of cob	Injury	Damage	Serious damage
3 inches (76.2 mm) to 6 inches (152.4 mm)	4	6	8
More than 6 inches (152.4 mm) to 10 inches (254.0 mm)	8	12	16
More than 10 inches (254.0 mm) to 13 inches (330.2 mm)	12	18	24

<sup>1</sup> In scoring injury, if more than the number of kernels allowed above are discoloured or punctured or if the husks have been penetrated in more than 1 place; damage, if more than the number of kernels allowed above are discoloured or punctured or if the husks have been penetrated in more than 2 places; serious damage, if more than the number of kernels allowed above are discoloured or punctured or if the husks have been penetrated in more than 3 places.


**Annex B**  
(informative)

**Guide to cold storage**

*Draft for comments only — Not to be cited as East African Standard*

**Annex C**  
(informative)

**Model certificate of conformity with standards for fresh fruits and vegetables**

1. Trader:	Certificate of conformity with the Community marketing standards applicable to fresh fruits and vegetables  No. ....  (This certificate is exclusively for the use of inspection bodies)		
2. Packer identified on packaging (if other than trader)	3. Inspection body		
	4. Place of inspection/country of origin <sup>(1)</sup>	5. Region of country of destination	
6. Identifier of means of transport	7. <input type="checkbox"/> Internal <input type="checkbox"/> Import <input type="checkbox"/> Export		
8. Packages (number and type)	9. Type of product (variety if the standards specifies)	10. Quality Class	11. Total net weight in kg
<p>12. The consignment referred to above conforms, at the time of issue, with the Community standards in force, vide:</p> <p><u>CD/K/027:2010, Fresh baby corn — Specification and grading</u></p> <p>_____</p> <p>Customs office foreseen ..... Place and date of issue .....</p> <p>Valid until (date): .....</p> <p>Signatory (name in block letters): .....</p> <p>Signature _____ Seal of competent authority _____</p>			
13. Observations:			
<p><sup>(1)</sup> Where the goods are being re-exported, indicate the origin in box 9.</p>			

## Annex D (informative)

### Fact sheets

#### D.1 *Zea mays*



<b>Authority</b>	L.
<b>Family</b>	Liliopsida:Commelinidae:Cyperales:Gramineae
<b>Synonyms</b>	<i>Zea mays</i> L. ssp. <i>mays</i> , <i>Zea curagua</i> Molina, <i>Zea indentata</i> Sturtev., <i>Zea indurata</i> Sturtev., <i>Zea japonica</i> Van Houtte, <i>Zea saccharata</i> Sturtev.
<b>Common names</b>	maize, corn, Mais, maiz, milho, yumi, khao phoat, bekolo, sila, sila nivava lagi, tomorokpsi, makai, makki, koane, fiso, sana, keto (Simbo/Roviana), kon, mielie, mahindi, ekidid (Karamojong), maidis stigmata, mbemba, poone, upfu, hupfu, mbila
<b>Editor</b>	
<b>Ecocrop code</b>	2175

#### Description

A tall vigorous annual grass, and grain crop varying greatly in size according to race and growth conditions; commercial types are about 2m tall. It has many fasciculate roots. The erect shoot (culm) consists of four basic structures: the internodes, the leaves, the prophyll and the bud or apical meristem, which are collectively called the phytomer. The leaves that emerge from its nodes are alternate, lanceolate, acuminate and parallel-veined with small ligules. Maize is a monoecious plant; it develops inflorescences with unisexual flowers, and these are always born in separate parts of the plant. The female inflorescence — the ear, arises from the axillary bud apices, and male inflorescence, the tassel, develops from the apical growing point at the top of the plant. The kernel or fruit of maize is called a caryopsis. The ovary wall or pericarp is fused with the seed coat or testa and these combined together make the fruit wall. The mature fruit consists of three major parts — fruit wall, diploid embryo and triploid endosperm. The outermost layer of the endosperm, in contact with fruit wall is called the aleurone layer. The mature corn kernel is made up of three main parts, the seed coat or pericarp, the starchy endosperm and the embryo often called the germ, which will develop into a new plant.

#### Uses

It is mainly grown for food and fodder. The grain is ground to flour and used in starchy foods and breads. It is used in breakfast foods. Fermented grain is made into alcohol, which has become a prime use in the USA. A ton of dried maize would yield about 370 kg of ethanol. Maize starch is used in cosmetics, adhesives, glucose and syrup. Oil is extracted from the embryo and used as salad oil, and to make linolium, paints, varnishes, etc.

#### Killing temperature

It is easily killed by frost.

#### Growing period

Annual. In Kenya quick-maturing lowland varieties flower in 60 days and mature in 120 days, varieties grown between 1200-2100 m in elevation flowers in 105 days and mature in 210 days, while varieties grown at 2100-3200 m may take 195 days to flower and more than 365 days to mature. In the United States on average it mature in 90-140 days.

## Further information

Maize is one of the most productive species of food plants being the second most important cereal grain after wheat, with milled rice occupying third place. It is the top ranking cereal in grain yield per hectare and is second to wheat in total production. Maize is of great economic significance worldwide as human food as animal feed, and as a source of large number of industrial products. Maize has tremendous variability in kernel colour, texture, composition and appearance. It is classified into distinct types based on (a) endosperm and kernel constitution; (b) kernel colour; (c) environment in which it is grown; (d) maturity; and (e) its use. White, yellow and orange are prominent grain colours. Prominent maize kernel types are flint, dent, pop, sweet, floury, morocho, and waxy. Quality Protein Maize (QPM with improved protein quality), and High Oil Corn are speciality maize types. It can be found at elevations between sea level and 4000 m and it can be grown at latitudes from 48°N to 40°S. The photosynthesis pathway C4 III for tropical lowland types and C4 IV for highland and temperate types. Hot, dry winds may reduce the amount of pollen available for fertilization and humid conditions and hail can do damage. Since the crop leaves much of the ground uncovered, soil erosion and water losses can be severe. The optimum yield is 7-11 t/ha, world average 3.6 t/ha. High yields of maize make a heavy drain on soil nutrients. It is probably indigenous to Mexico and Central America.

### D.2 *Zea mays* ssp. *mays*



<b>Authority</b>	L.
<b>Family</b>	Liliopsida:Commelinidae:Cyperales:Gramineae
<b>Synonyms</b>	
<b>Common names</b>	corn
<b>Editor</b>	
<b>Ecocrop code</b>	238663

## Description

A tall, coarse grass and grain crop up to 40-700 cm with strong erect stalks and long narrow leaves.

## Uses

It is mainly grown for food and fodder. The grain is ground to flour and used in starchy foods and breads. It is used in breakfast foods, i.e. corn-flakes. Fermented grain is made into whiskey and industrial alcohol. Corn starch is used in cosmetics, adhesives, glucose, and syrup. Oil is extracted from the seed embryo and used as salad oil, and to make linolium, paints, varnishes, soaps, glycerine, and high fructose syrup. Mentioned as a useful agroforestry species.

## Growing period

Annual. In Kenya quick-maturing lowland varieties flower in 60 days and mature in 120 days, varieties grown between 1200-2100 m in elevation flowers in 105 days and mature in 210 days, while varieties grown at 2100-3200 m may take 195 days to flower and more than 365 days to mature. In the United States corn on average mature within 130-140 days and some cultivars only require 90 days.

## Common names

Maize, Mais, Maiz, Sweet corn, Mealies, Corn, Green maize, Bok'olo, Indian corn, Blue corn.

## Further information

Maize can be found at elevations between sea level and 4000 m and it can be grown at latitudes from 48°N to 40°S. Photosynthesis pathway C4 III for tropical lowland and C4 IV for highland and

temperate types. Hot, dry winds may reduce the amount of pollen available for fertilization and very humid conditions are not considered good for maize. Hail can do great damage to the crop. Since the crop leaves much of the ground uncovered, soil erosion and water losses can be severe. The optimum yield is 7-11 t/ha, world average 3.6 t/ha. High yields of maize make a heavy drain on soil nutrients and it has a high nitrogen requirement. The species is probably indigenous to Mexico and Central America. Some short-season varieties are able to develop with only 300 mm of rain.

**D.3 *Zea mays* ssp. *saccharata***

<b>Authority</b>	Sturt
<b>Family</b>	Liliopsida:Commelinidae:Cyperales:Gramineae
<b>Synonyms</b>	
<b>Common names</b>	sweet corn, sweet maize, milho doce
<b>Editor</b>	
<b>Ecocrop code</b>	10981

**Description**

A grass and grain crop.

**Uses**

It is mainly grown for food and fodder. It is eaten as a fresh, frozen or canned vegetable.

**Growing period**

Can be harvested immature 65-95 days after sowing. (For further information please see under *Zea mays* s. *mays*)

**Common names**

Sweet corn, Maize, Mealies, Corn, Mais Sucre, Maiz Dulce, Zukermais, Suikermais.

**Further information**

Elevations up to 2000 m are considered suitable for growing of cultivars which are adapted to short days and high temperatures. Hot, dry winds may reduce the amount of pollen available for fertilization, also very humid conditions are not considered good for maize. Yields are normally 2 cobs per plant, producing 7-15 t/ha. The seeds have relatively high sugar content. (For further information please see under *Zea mays* s. *mays*)

## Annex E (informative)

### Sweet (baby) corn — Codex, EU and USA pesticide residue limits

Users are advised that international regulations and permissible Maximum Residue Levels (MRL) frequently change. Although this International MRL Database is updated frequently, the information in it may not be completely up-to-date or error free. Additionally, commodity nomenclature and residue definitions vary between countries, and country policies regarding deferral to international standards are not always transparent. This database is intended to be an initial reference source only, and users must verify any information obtained from it with knowledgeable parties in the market of interest prior to the sale or shipment of any products. The developers of this database are not liable for any damages, in whole or in part, caused by or arising in any way from user's use of the database.

#### Results Key

MRL values in *(Italics)* are more restrictive than US

--- indicates no MRL value is established.

Cod, EU, etc. indicates the source of the MRL and EXP means the market defers to the exporting market.

All numeric values listed are in parts per million (ppm), unless otherwise noted

#### Corn, Sweet, Kernels Plus Cob With Husks Removed

<b>2,4-D</b>	0.05	0.05	0.05
	1. European Union does not maintain a specific MRL for the 2,4-D/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Vegetables Fresh or Frozen" group.		
	<b>US</b>	<b>Cod</b>	<b>EU</b>
<b>Acetochlor</b>	0.05	---	0.1
	<b>US</b>	<b>Cod</b>	<b>EU 2</b>
<b>Alachlor</b>	0.05	---	0.1
	2. European Union does not maintain a specific MRL for the Alachlor/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.1 PPM for its "Fruiting vegetables" group.		
	<b>US</b>	<b>Cod</b>	<b>EU</b>
<b>Ametryn</b>	0.25	---	---
	<b>US</b>	<b>Cod</b>	<b>EU</b>
<b>Atrazine</b>	0.2	---	<i>{0.1}</i>
	<b>US</b>	<b>Cod</b>	<b>EU</b>
<b>Azoxystrobin</b>	0.03	---	0.05
	<b>US</b>	<b>Cod</b>	<b>EU</b>
<b>Benoxacor</b>	0.01	---	---
	<b>US</b>	<b>Cod</b>	<b>EU 3</b>
<b>Bentazon</b>	0.05	---	0.1
	3. European Union does not maintain a specific MRL for the Bentazon/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.1 PPM for its "Fruiting vegetables" group.		
	<b>US</b>	<b>Cod</b>	<b>EU</b>
<b>Beta-cyfluthrin</b>	0.05	---	---
	<b>US</b>	<b>Cod</b>	<b>EU</b>
<b>Bifenthrin</b>	0.05	---	0.05
	<b>US</b>	<b>Cod</b>	<b>EU 4</b>
<b>Butylate</b>	0.1	---	<i>{0.05}</i>
	4. European Union does not maintain a specific MRL for the Butylate/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Vegetables Fresh or Frozen" group.		
	<b>US</b>	<b>Cod</b>	<b>EU</b>
<b>Carbaryl</b>	0.1	0.1	---

	US	Cod	EU 5
<b>Carboxin</b>	0.2	---	{0.1}
	5. European Union does not maintain a specific MRL for the Carboxin/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.1 PPM for its "Fruiting vegetables" group.		
	US	Cod	EU 6
<b>Carfentrazone-ethyl</b>	0.1	---	{0.01}
	6. European Union does not maintain a specific MRL for the Carfentrazone-ethyl/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.01 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU
<b>Chlorethoxyphos</b>	0.01	---	---
	US	Cod	EU
<b>Chlorothalonil</b>	1	{0.01}	{0.01}
	US	Cod	EU
<b>Chlorpyrifos</b>	0.05	{0.01}	0.05
	US	Cod	EU 7
<b>Clopyralid</b>	1	---	{0.5}
	7. European Union does not maintain a specific MRL for the Clopyralid/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.5 PPM for its "Fruiting vegetables" group.		
	US	Cod	EU
<b>Clothianidin</b>	0.01	---	0.02
	US	Cod	EU
<b>Cyanazine</b>	0.05	---	---
	US	Cod	EU
<b>Cyfluthrin</b>	0.05	---	{0.02}
	US	Cod	EU
<b>Cyprosulfamide</b>	0.01	---	---
	US	Cod	EU
<b>Deltamethrin</b>	0.03	{0.02}	0.05
	US	Cod	EU
<b>Dicamba</b>	0.04	---	0.07
	US	Cod	EU
<b>Difenoconazole</b>	0.01	---	0.05
	US	Cod	EU
<b>Difflufenzopyr</b>	0.05	---	---
	US	Cod	EU 8
<b>Dimethenamid</b>	0.01	0.01	0.01
	8. European Union does not maintain a specific MRL for the Dimethenamid/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.01 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU
<b>Endosulfan</b>	0.2	---	{0.05}
	US 9	Cod	EU 10
<b>EPTC</b>	0.1	---	{0.05}
	9. United States does not maintain a specific MRL for the EPTC/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.1 PPM for its "Grain Crops" group.		
	10. European Union does not maintain a specific MRL for the EPTC/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Fruiting vegetables" group.		
	US	Cod	EU
<b>Ethoprop</b>	0.02	---	0.02

	US	Cod	EU 11
<b>Fenvalerate</b>	0.1	0.1	{0.02}
	11. European Union does not maintain a specific MRL for the Fenvalerate/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.02 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU
<b>Flubendiamide</b>	0.01	---	0.01
	US	Cod	EU 12
<b>Flufenacet</b>	0.05	---	0.05
	12. European Union does not maintain a specific MRL for the Flufenacet/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Fruiting vegetables" group.		
	US	Cod	EU 13
<b>Fluroxypyr</b>	0.02	---	0.05
	13. European Union does not maintain a specific MRL for the Fluroxypyr/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU
<b>Fluthiacet-methyl</b>	0.01	---	---
	US	Cod	EU
<b>Gamma Cyhalothrin</b>	0.05	---	---
	US	Cod	EU 14
<b>Glyphosate</b>	0.1	---	0.1
	14. European Union does not maintain a specific MRL for the Glyphosate/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.1 PPM for its "Fruiting vegetables" group.		
	US	Cod	EU 15
<b>Halosulfuron-methyl</b>	0.05	---	{0.01}
	15. European Union does not maintain a specific MRL for the Halosulfuron-methyl/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.01 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU
<b>Imidacloprid</b>	0.05	{0.02}	0.1
	US	Cod	EU 16
<b>Indoxacarb</b>	0.02	0.02	0.02
	16. This MRL is provisional.		
	US	Cod	EU
<b>Inorganic bromide resulting from fumigation</b>	50	---	{30}
	US	Cod	EU
<b>Isoxadifen-ethyl</b>	0.04	---	---
	US	Cod	EU
<b>Lambda Cyhalothrin</b>	0.05	---	0.05
	US	Cod	EU 17
<b>Linuron</b>	0.25	---	{0.05}
	17. European Union does not maintain a specific MRL for the Linuron/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Fruiting vegetables" group.		
	US	Cod	EU
<b>Malathion</b>	2	{0.02}	{0.02}
	US	Cod 18	EU
<b>Mancozeb</b>	0.5	{0.1}	{0.05}
	18. The MRL is established for the sum of dithiocarbamates.		

	US	Cod 19	EU
<b>Maneb</b>	5	{0.1}	{0.05}
	19. The MRL is established for the sum of dithiocarbamates.		
	US	Cod	EU 20
<b>Mesotrione</b>	0.01	---	0.05
	20. European Union does not maintain a specific MRL for the Mesotrione/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Vegetables Fresh or Frozen" group.		
	US 21	Cod	EU
<b>Metalaxyl</b>	0.1	---	{0.05}
	21. United States does not maintain a specific MRL for the Metalaxyl/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.1 PPM for its "Grain Crops" group.		
	US	Cod	EU
<b>Metconazole</b>	0.01	---	0.02
	US	Cod	EU 22
<b>Methomyl</b>	0.1	---	{0.05}
	22. Methomyl and Thiodicarb (sum of methomyl and thiodicarb expressed as methomyl)		
	US	Cod	EU
<b>Methoxyfenozide</b>	0.05	{0.02}	{0.02}
	US	Cod	EU 23
<b>Metolachlor</b>	0.1	---	{0.05}
	23. European Union does not maintain a specific MRL for the Metolachlor/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU 24
<b>Metribuzin</b>	0.05	---	0.1
	24. European Union does not maintain a specific MRL for the Metribuzin/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.1 PPM for its "Fruiting vegetables" group.		
	US	Cod	EU 25
<b>Nicosulfuron</b>	0.1	---	{0.05}
	25. European Union does not maintain a specific MRL for the Nicosulfuron/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU
<b>Nitrapyrin</b>	0.1	---	---
	US	Cod	EU 26
<b>Oxydemeton-methyl</b>	0.5	---	{0.02}
	26. European Union does not maintain a specific MRL for the Oxydemeton-methyl/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.02 PPM for its "Fruiting vegetables" group.		
	US	Cod 27	EU 28
<b>Paraquat dichloride</b>	0.05	0.05	{0.02}
	27. Codex does not maintain a specific MRL for the Paraquat dichloride/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Fruiting vegetables, other than Cucurbits" group.		
	28. European Union does not maintain a specific MRL for the Paraquat dichloride/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.02 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU 29
<b>Pendimethalin</b>	0.1	---	{0.05}
	29. European Union does not maintain a specific MRL for the Pendimethalin/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Fruiting vegetables" group.		

	US	Cod	EU 30
<b>Permethrin</b>	0.1	0.1	{0.05}
	30. European Union does not maintain a specific MRL for the Permethrin/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU 31
<b>Phorate</b>	0.05	---	0.05
	31. European Union does not maintain a specific MRL for the Phorate/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU
<b>Primisulfuron-methyl</b>	0.1	---	---
	US	Cod	EU 32
<b>Propiconazole</b>	0.1	{0.05}	{0.05}
	32. European Union does not maintain a specific MRL for the Propiconazole/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Fruiting vegetables" group.		
	US	Cod	EU
<b>Pyraclostrobin</b>	0.04	---	{0.02}
	US	Cod	EU 33
<b>S-metolachlor</b>	0.1	---	{0.05}
	33. European Union does not maintain a specific MRL for the S-metolachlor/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.05 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU
<b>Sethoxydim</b>	0.4	---	0.5
	US	Cod	EU 34
<b>Simazine</b>	0.25	---	{0.1}
	34. European Union does not maintain a specific MRL for the Simazine/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.1 PPM for its "Fruiting vegetables" group.		
	US	Cod	EU
<b>Spinetoram</b>	0.04	---	0.05
	US	Cod	EU
<b>Spinosad</b>	0.02	{0.01}	0.02
	US	Cod	EU
<b>Spiromesifen</b>	0.02	---	0.02
	US	Cod	EU
<b>Tebuconazole</b>	0.5	---	{0.2}
	US	Cod	EU
<b>Tefluthrin</b>	0.06	---	{0.05}
	US	Cod	EU
<b>Tembotrione</b>	0.04	---	0.05
	US	Cod	EU 35
<b>Terbufos</b>	0.05	{0.01}	{0.01}
	35. European Union does not maintain a specific MRL for the Terbufos/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.01 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU
<b>Thiamethoxam</b>	0.02	---	0.05
	US	Cod	EU
<b>Thiencarbazone-methyl</b>	0.01	---	---
	US	Cod	EU
<b>Thiodicarb</b>	2	---	{0.05}

	US	Cod	EU 36
<b>Topramezone</b>	0.01	---	0.01
	36. European Union does not maintain a specific MRL for the Topramezone/Corn, Sweet, Kernels Plus Cob With Husks Removed combination, but does maintain an MRL of 0.01 PPM for its "Vegetables Fresh or Frozen" group.		
	US	Cod	EU
<b>Triadimenol</b>	0.05	---	0.1
	US	Cod	EU
<b>Trifloxystrobin</b>	0.04	---	{0.02}
	US	Cod 37	EU
<b>Zeta-Cypermethrin</b>	0.05	0.05	0.05
	37. The MRL is established for the sum of cypermethrin and zeta-cypermethrin.		

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