



FLORAL BIOLOGY OF SORGHUM

**Prepared by: Dr Pusarla Susmitha
Assistant Professor
Dept. of Seed Science and Technology**

INTRODUCTION

Botanical name: *Sorghum* *bicolor*

Family: Graminae

Origin: Ethiopia

Common name: Camel crop

Chromosome no: $2n=20$

Seed (fruit type): grain (caryopsis)

BOTANY

- Sorghum is an annual or perennial grass.
- The root system is fibrous.
- The stem is erect with leaves alternating on opposite sides on nodes.
- Basal tillers are formed at the first node.
- No. of leaves range from 7-28.
- The leaves have drought tolerance because of:-
 - Small size of stomata cells during drought.
 - A waxy layer which limits water loss.
 - Presence of motor cells which cause rolling of leaves under drought stress.

LOOSE & COMPACT INFLORESCENCE



Sorghum
Loose panicle

The inflorescence is a panicle with a central rachis from which come primary branches. They give rise to secondary & Some times tertiary branches which carry the racemes of spike-lets

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Sorghum
Compact panicle

The inflorescence is a panicle with a central rachis from which come primary branches. They give rise to secondary & Some times tertiary branches which carry the racemes of spike-lets

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INFLORESCENCE

- Inflorescence is raceme type(Panicle).
- The panicle varies from being very loose to compact.
- The panicle consists of spikelets which occurs in pairs.
- One pair is sessile, hermaphrodite & fertile.
- Other pair is pedicellate, male & sterile.

PANICLE OF SORGHUM

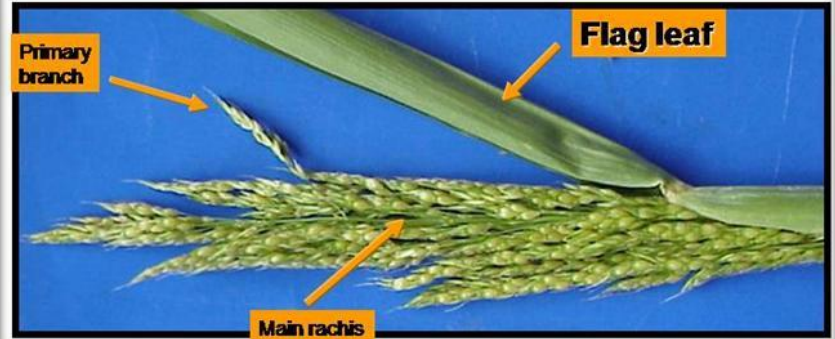
SORGHUM

Flag leaf



Panicle enclosed in the flag leaf

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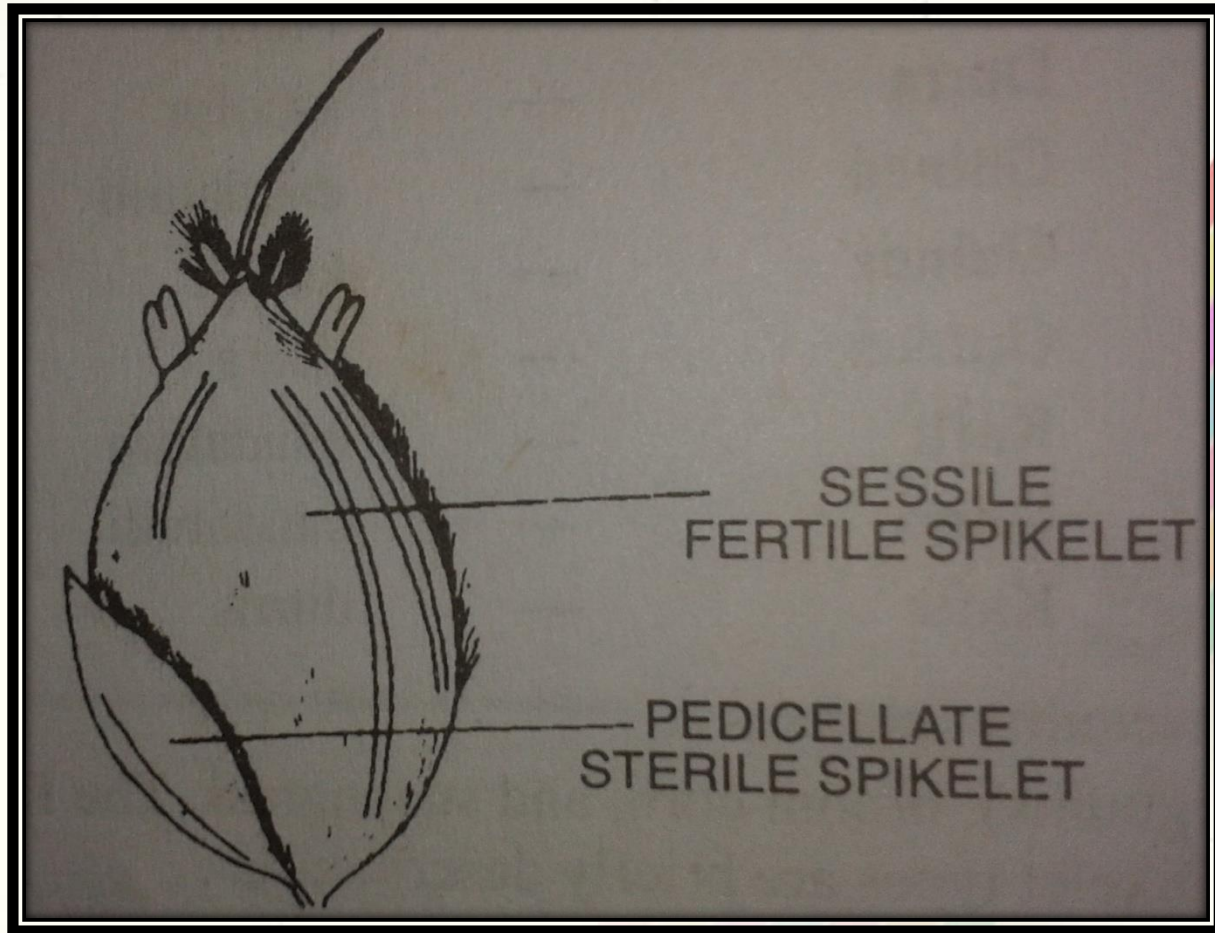
SORGHUM

Loose panicle inside flag leaf

The inflorescence is a panicle with a central rachis from which come primary branches. They give rise to secondary & Some times tertiary branches which carry the racemes of spike-lets

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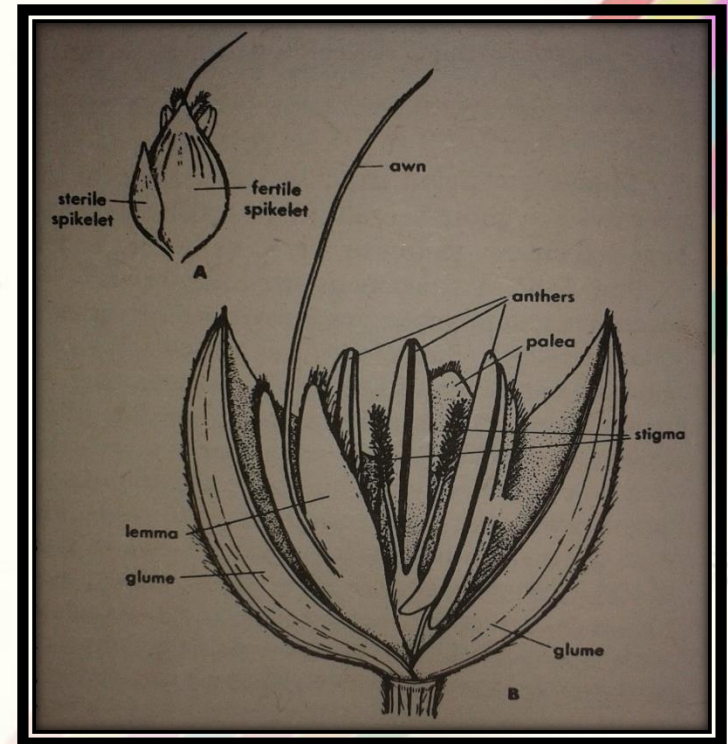
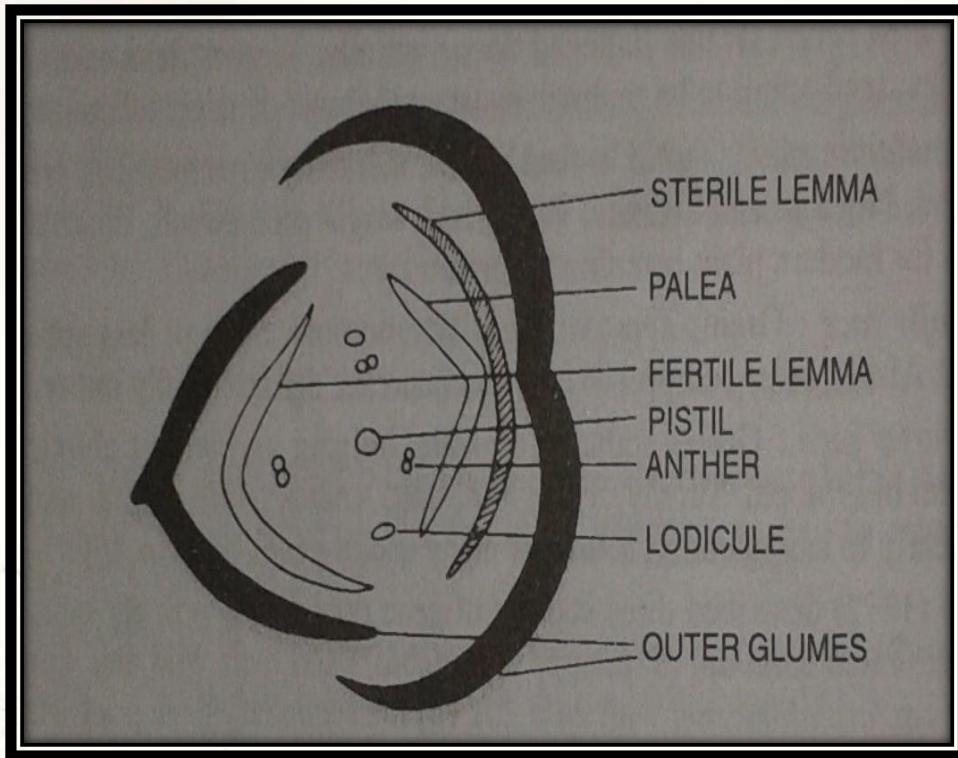
PAIR OF SPIKELETS



SESSILE SPIKELETS

- The sessile spikelet has 2 glumes with 2 florets.
- One is fertile, bisexual consists of a membranous lemma & a small thin delicate palea.
- Two lodicules are present adjacent to fertile lemma.
- Lodicules are fleshy and truncate.
- Stamens: 3
- Pistil: an ovary with two long styles with a feathery stigma.

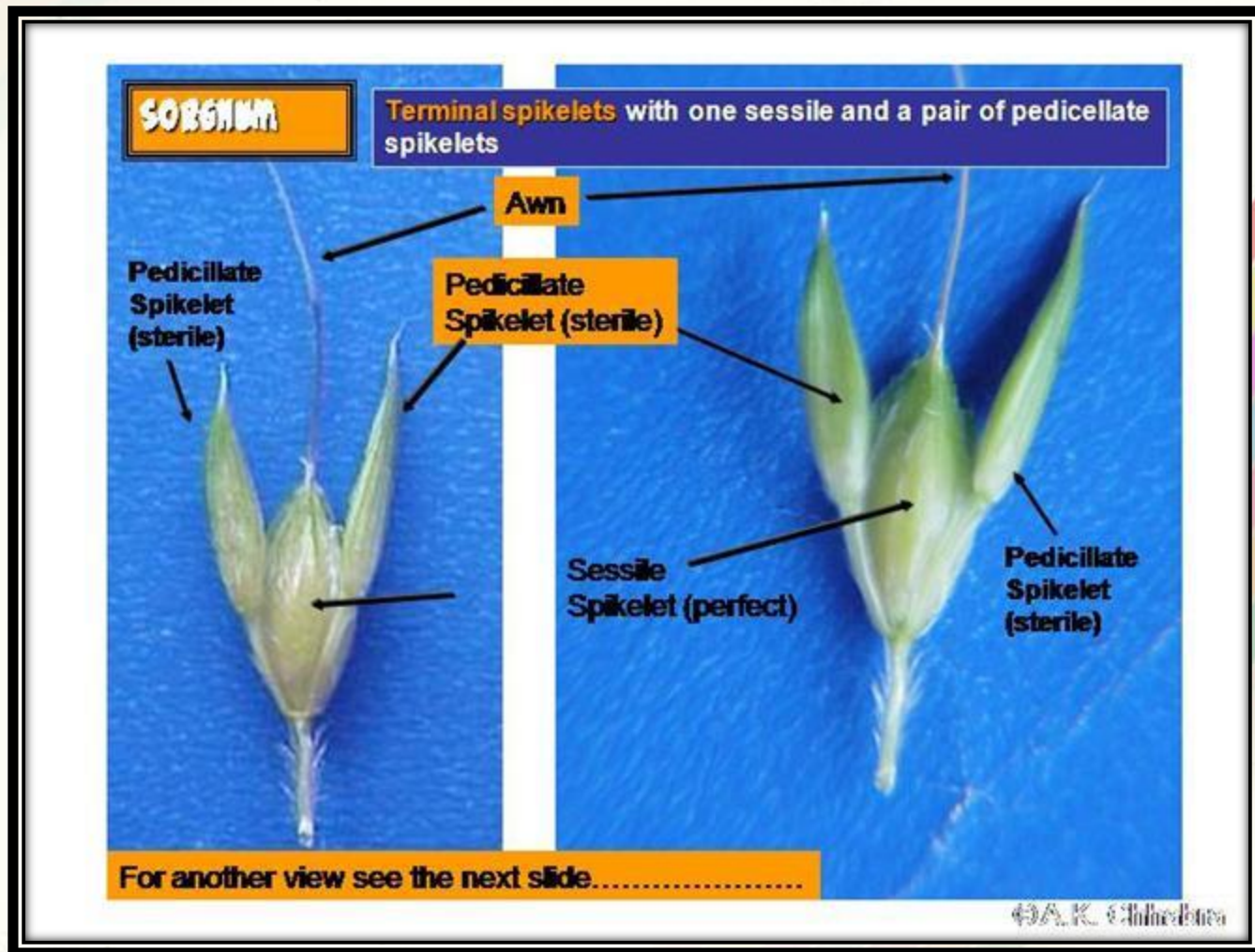
STRUCTURE OF SESSILE SPIKELET



PEDICELLATE SPIKELETS

- Two leathery boat shaped glumes enclosing 2 florets.
- The lower floret is represented by lemma & upper floret is staminate with short awned lemma.
- Palea: absent
- Stamens: 3
- Pistil: absent

STRUCTURE OF PEDICILLATE SPIKELET



FLOWERING

- Flowering occurs 30-40 days after germination i.e 2-4 days after emergence of panicle from boot leaf.
- Flowering starts in sessile spikelets at tip of inflorescence & progresses towards bottom.
- The pedicellate spikelets open later & complete flowering earlier than in sessile spikelets.

Sorghum bicolor flower



GeoChemBio.com

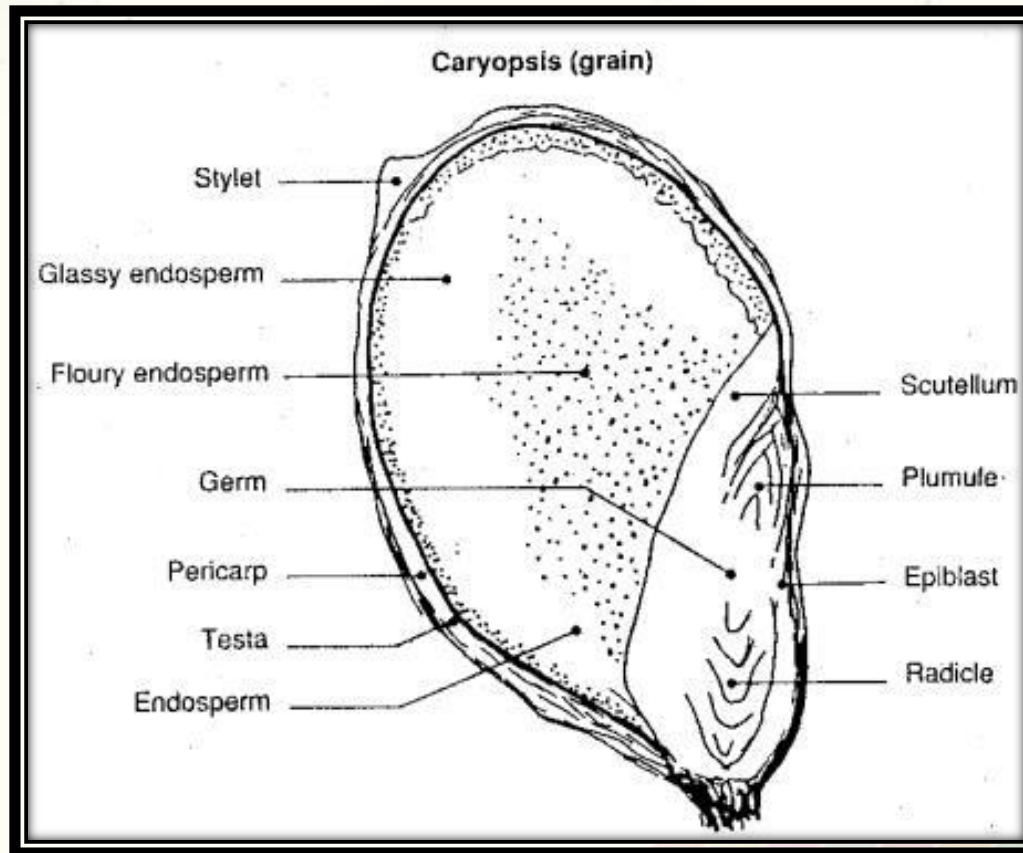
POLLINATION

- Sorghum is a self pollinated crop but 2-10% cross pollination may occur.
- The anthers & stigmas push out as the glumes open.
- The anthers dehisce and release pollen.
- Receptivity of stigma starts 2 days before opening and remains for several days.
- Sorghum is a short day plant & hastened by short day light periods and high temperatures.

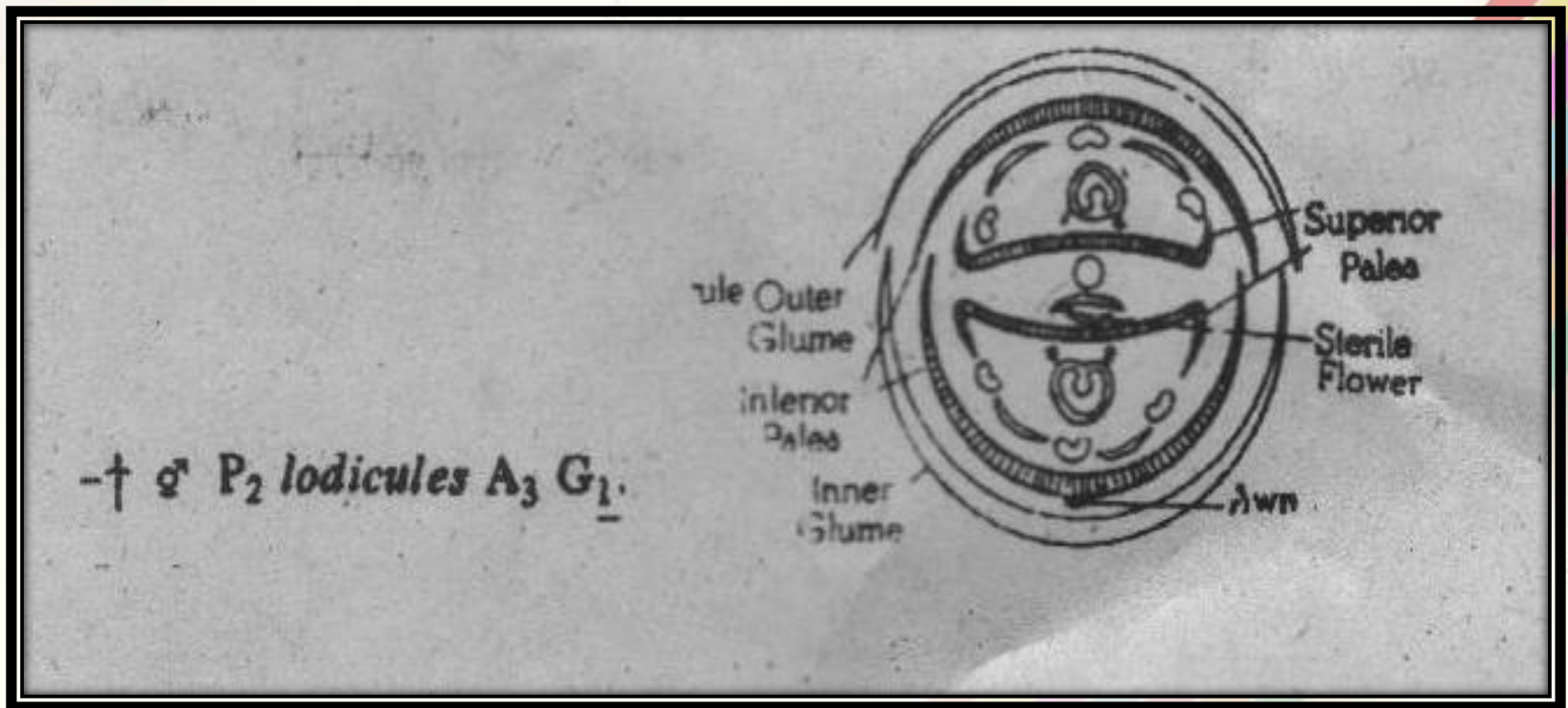
SEED DEVELOPMENT

- After fertilization, embryo is developed.
- The deposition of starch grains begin about 10 days after fertilization.
- Seed development is in 3 stages:
 - Milk stage
 - Soft dough stage
 - Hard dough stage
- The seed consists of pericarp (outer coat, 6% by weight), endosperm (storage tissue 84%) & embryo (germ, 10%).
- Embryo is made of 70% fat and 13% in the grain.

STRUCTURE OF SEED



FLORAL FORMULA & DIAGRAM



REFERENCES

- M.Bhaskaran et.al, Principles of seed production & quality control, Kalyani publishers.
- Hari hara ram, Breeding & genetics of field crops, kalyani publishings.
- Internet



THANK YOU