Lecture 10. Oil Seeds

Castor *Ricinus communis* (2n=20) Euphorbiaceae

Botany

Habit varies, mostly herbs but shrubs and trees are also common. Leaves simple or compound stipulate, latex commonly present, inflorescence in its ultimate arrangements is cymose , flowers small, regular, unisexual, perianth usually calycine , rarely petaloid sometimes altogether wanting, male flower –stamens a many as double as many as perianth leaves or numerous of flower or sometimes only one , the male flowers sometimes rudiment of the ovary , female flower ovary generally three celled, ovules one or two in each chamber, styles and stigmas as many as the cells, fruit (rigma) generally a capsule splitting into three coccid that separate from a persistent central column

Distinguishing characters.

Presence of bloom –Ashy coating on the leaves and stem of the plant. Monoecious condition- unisexual flowers, male at the bottom and female at the top. Androecium – polyadelphous condition, filaments branched. The hilum almost concealed under the carancle. Presence of thin leaf like cotyledon. Toxic alkaloids like ricin (blood coagulant) ricinin and allergen are present.

Fruits(Regma)

Fruits (Regma)

It develops from tricarpellary syncarpous superior trilocular ovary and splilts into many parts called cocci. Four distinct size groups of fruits namely 1)very small fruits are found in ornamental types and in some of the wild perennial types. 2) Small and 3) medium types are preferred for cultivation since they fairly high oil content varying from 45 to 57 %. 4) Big seeds have generally low oil content of less than 40%. Very small seeds are preferred for medicinal purposes.

On the fruit the epicarp may be either smooth or warty or spiny. Attractively colored types of horticultural value with colored inflorescences and fruits have been evolved. The seeds color ranges from white to gray deep chocolate, purple and red. Mottling is also much varying. The seed has no dormancy.

Sunflower - *Helianthus annus* (2n= 34) Asteraceae

Botany

Plants are usually herbs, leaves exstipulate ,flowers aggregated into heads, an involucre of bracts surrounds the head or capitulum , calyx reduced to bristles or modified into papas, corolla (5) valvate in all disc florets, but in marginal ray florets which may sterile or lack stamens and acts as an attraction for insects , inner hermaphrodite bisexual flowers . Stamens epipetalous with syngenesious anthers forming a ring through which the style passes. Stigmas 2. Ovary inferior, one chambered with one anatropous ovule, fruit-achene (A small hard dry indenescent one seeded fruit. The wall of single seed is free from the hard pericarp or wall of the fruit)

Safflower *Carthamus tinctorius (*2n = 24) Asteraceae

Safflower is an important oilseed crop in India. It is slowly becoming of increasing importance as an oil crop for the drier parts of tropics and subtropic. In India it is cultivated for both oil and reddish dye called safflower dye (cathamin) from florets. At the time of full bloom

flowers collected and corolla alones removed and dried. Yellow dye is obtained by washing and dissolving it is water. There are two coloring matters. 1. Yellow pigment soluble in water and red color soluble in alkalis. The seed /fruit is **achene**

Rape and Mustard *Brassica* sp. (2n=16, 18, 20, 22, 36)

Botany of cruciferae.

Annual, biennial or perennial herbs, a watery sap present, plants emit a sulphorous odour. Stem covered by unicellular stellate hairs. Flowers arranged in typical racemes, usually ebractate, sepals in two alternating dimerous whorls , petals 4, clawed diagonally placed stamens tetra dynamous carpels 2, ovary two chambered, the development of a false septum,ovules numerous on two parietal placentas. Fruit a **Siliqua** (It develops from bicarpellary syncarpous gynoecium with parietal placentation and a false septum. It is a long narrow multiseeded fruit which dehisces from below upwards by both sutures. **Siliqula.** It is a broad flat and shortened form of siliqua.)

The group rape and mustard includes the oil yielding species of Brassica. The commercial Indian rape seed and mustard are often mixture of rape seed, mustard and colza in varying proportion. The seeds go by different name in different parts of the country. Generally both colza (sarson) and rape (toria) are called together rape seed. Rai is mustard. Cultivated Brassica can be broadly divided into two distinct types.

1. Vegetable type - cabbage,(*Brassica oleraceae* - var capitata.) cauliflower (*Brassica oleraceae* varbotrytis). Turnip (*Brassica oleraceae* var rapa)

2. Oil seed type.**1) Rape seed** *Brassica compestris* and 2**) Mustard** *Brassica nigra*.

Rape seed

a) *Brassica compestris* (2n= 20)

Indian rape seed is self sterile in natures. Important oilseed crop of N.India. There are three cultivated types.

Brassica compestris var. **brown sarson**

Brassica compestris var.**Yellow sarson**

Brassica compestris var. **toria**

b) *Brassica napus* 2n=38 European rape seed. Self fertile grown in Europe

Mustard

a) *B. nigra* (2n=16) Black or true mustard. Banarasi rai contains 28% of fixed oil used as medicine . Oil is pungent due to presence of glucoside sinigrin mostly used as contiments.

b) B. alla 2n=24. White mustard or ujli sarson. Young seedlings used as salads. Seeds yellowish in color contains 30% oil.

c) B. juncea 2n=36 Indian mustard.(Brown sarson).Popularly known as rai contains 35% oil. Leaves are used as herbal medicines. Most pungent among cultivated oil seeds. It contains glucoside sinigrin.

The oil producing species of Brasicca are all cross fertilized.

Key characters

Leaves two types 1) stem leaves bigger, lance shaped and serrated. Flower leaf small smooth margin. Androecium tetradynamous . Fruit sliqua. The oil content of the seed varies from 30-45% depending on the variety.

Fibers

The fibers are obtained from the sclerenchymatous cells found in the plant body and these fiber cells occur either in groups or bundles. Chemically the fiber cell consists chiefly of cellulose with lignin or semi cellulose or any other substances. The commercial term fiber includes generally all thin and slender substances, which can be spun or made use of as fine stuffing material. Fiber cells are non-living structures, when mature and serve as a purely mechanical function, i.e. they impart strength and rigidity to the plant body.