

Lesson 5
Rapeseed-Mustard
Brassicas sp.

Brassicas are grown next to peanut in India. Rapeseed-mustard is a common name to three Genera :

- *Brassica*
- *Eruca*
- *Sinapsis*

- o Brassica is more important

Importance of Brassicas in India

- o It is main Rabi season crop in India
- o Green tender plant is used as vegetable
- o Whole seed is for preparing pickles and flavoring vegetables and curries
- o Oil for cooking, frying and pickles
- o Oil is also used for vegetable ghee, hair oil, soap, lubricating oil, and tanning industries
- o Seed & oil have peculiar pungency
 - o Due to presence of glucose sinigrin
- o Oil cake is a cattle feed to be fed at smaller quantity

Canola

- o It is a trade name to rapeseed oils which possess
 - o <2% erusic acid
 - o Solid components should contain
 - <30 micromoles /g of glucosinolates
- o May be Canadian oil like “Mazola” (maize oil – Corn oil), “Sanola” sunflower oil (again brand name for PUFA content)
- o Of late refers to ‘generic’ but
 - o Those rapeseed varieties meeting above the specification (Erusic acid causes heart lesions and Glucosinolates cause thyroid enlargement)

Brassicas grown in India

Taxonomic name	Common name	Hindi	Oil Content
<i>B. Campestris</i>	Turnip rape	Brown sarson	Kali sarson
Var. <i>brown sarson</i>	Brown sarson	Kali sarson	43%
Var. <i>yellow sarson</i>	Yellow sarson	Peeli sarson	45%
Var. <i>toria</i>	Indian rape	Toria	35%
<i>B. napus</i>	Swede, summer, winter rape	Gobhi sarson	Oilseed
<i>B. Juncea</i>	Indian mustard Mustard	Rai, Raya Laha	35%
<i>B. toumefortii</i>	Wild mustard	Jungli rai	18%

<i>B. carinata</i>	Ethiopian mustard	Karan rai	Oilseed
<i>B. nigra</i>	Black mustrad	Banarsi rai	29% Condiment
<i>B. Oleratea</i>			Vegetables
<i>Eruca sativa</i>	Rocket	Taramira	28%

Rapeseed vs. Mustard

Character	Rapeseed (Sarson/Toria/Lahi)	Mustard (Rai, Raya, Laha)
Plant height (cm)	45 – 150	90-200
Leaves	Sessile, leaf lamina claps the stalk	Leaves stalked but do not clasp
Siliquae (pod)	Short or thicker	Long & slender
Pollination	Cross pollinated	Self pollinated
Seed coat	Smooth	Rough

Brown sarson vs. Yellow sarson

Character	Brown sarson	Yellow sarson
Leaves	Pale, thin	Dark green and fleshy
Branching	Erect, spreading	Erect
Siliquae (pod)	Thin, narrow	Thick and broad
Seed coat	Dark brown to reddish brown & mucilaginous	Yellow & non mucilaginous

Origin

- Rai – China
- Toria – East Afghanistan
- Brown sarson – E. Afghanistan & adjoining Indian sub-continent
- Yellow sarson – N.E. India

Rapeseed-Mustard : Area cultivated in the world (1997) – (Million ha & million t)

Country	Area	Production	Productivity
India	6.81	6.96	1.02
China	6.79	9.54	1.41
Canada	4.84	6.19	1.29
France	0.99	3.49	3.53
Germany	0.92	2.84	3.10
World	24.2	35.15	1.45

Rapeseed-Mustard : Area in India (1997) (Million ha & million t)

State	Area	Production	Productivity
Rajasthan	2.96	2.65	0.99
UP	1.43	1.47	1.03
Gujarat	0.34	0.47	1.37
Haryana	0.61	0.89	1.46
MP	0.82	0.75	0.91
WB	0.32	0.28	0.89
Assam	0.28	0.14	0.51
Punjab	0.09	0.11	1.27
India	6.81	6.96	1.02

Brassicac Area in India

- Till independence area remained constant (2.0million ha)
- From 50's area rose steadily
 - Due to increase in irrigated area
 - Increased productivity, varieties and agronomic practices
 - Maximum area was in 6.87 million ha -96-97
- Major states growing are
 - Rajasthan, UP, Gujarat, Haryana, MP, WB, Assam & Punjab

Climate

- A crop of temperate
- Can be in higher elevation of tropics
- Rabi season crop in India,
 - Sep-Oct to Mar-Apr
- Temperature range 3 to 40°C
- Optimum 18-25°C with cool, dry clear weather
- High RF, high humidity, cloudy atmosphere at flowering undesirable
- Most susceptible to frost

Season

- Sowing starts from August ends in November
- Sowing of rapeseed is ahead of mustard
- Taramira is sown from mid-Sep to Oct end
- Region wise season varies

Varieties

- Mustrad
 - Varuna (T 59), TM 2, TM 4, Seetha
- Brown sarson
 - KNS 3, KOS 1
- Yellow sarson
 - PUSA GOLD, YS 93
- Toria
 - Jawahar Toria, Panchali, TS 29
- Taramira
 - RTM 13, TMC 1

Soil

- Varying soil from sandy loam to clay
- Thrives well in light soil
- Mustard on any soil but rapeseed in light
- Well drained soil is more suitable
- Waterlogging should not be
- Saline alkaline soils are unsuitable
- pH 6.5 to 7.5, neutral soil is ideal

Land preparation

- Fine seed bed since seeds are small
- Flat bed to perform ferti cum seed drill

Seed rate & spacing

- 4-6 kg depending upon seed weight
 - 3-5 g/1000 depending upon crop and variety
- 30 x 10 to 30 x 15cm
 - 22.2 to 33.3 plants m⁻²

Sowing

- Treat the seeds with fungicides well before sowing
- May be behind the country plough
- Ferti cum seed drill
- Depth of sowing 3-4cm
- Avoid shallow sowing
- Cover the seeds after sowing
- Sowing may be on conserved soil moisture

Manuring

- Oil seed crops removes huge nutrients
- S is removed in large and needs return
- General recommendation varies to States
- 60-40-40 for irrigated
 - Half N 30 DAS
 - If SSP is applied S is taken care, if not
 - 20-40kg elemental sulphur, if soil analyzed with <10ppm
- 30-20-20 for rainfed (half of irrigated)
 - All basal
- Nutrient requirement may be calculated by critical concentration
 - 6.07 – 6.62% N in top 2-3rd leaf at 60 DAS
 - 0.408 – 0.412% S in 4-5th leaf from top
- Integration with biofertilizer 'Azotobactor' is desirable

Irrigation

- Total water requirement - 400mm
- Moisture at pre-flowering and pod filling stage is critical
 - Two irrigations for mustard
 - One at rosette stage (20-30DAS)
 - Another at siliqua atage (50-60DAS)

- In light soils three irrigations, the third at 90DAS
- IW/CPE ratio of 0.6 is optimum

Weed management

- Dominant weeds
 - *Chenopodium album*
 - *C. murale*
 - *Convolvulus arvensis*
 - *Melilotus alba*
- Intercultural operation 5-10days after 1st irrigation
 - Hand hoeing is desirable, it aerates the soil
 - Soil aeration is to conserve soil moisture
- Herbicides can also be used
 - Pendimethalin pre-emergence 0.5-1.5 kg/ha based on soil
 - Fluchloralin 1.25kg pre-plant incorporation
 - Post emergence Isoproturan 0.75 kg /ha for
 - Wheat+mustard mixed systems

Harvesting maturity

- Color of leaves, stem and silique turn green to pale yellow
- Lower silique looks – dried appearance
- Upper may be green
- Seeds in the silique makes rattling sound
 - Silique with 2 carpels and a false septum
 - During over maturity the two carpels split and seeds shed
 - Premature harvest leads to shriveled grains

Threshing

- After sun drying for few hours
- Beating pods along with the plants
 - Either manually
 - Machine
 - Walking bullocks, or running tractor
- Cleaning and drying to 8-10% moisture for storage
- Average yield
 - Irrigated rapeseed 1.5 to 2.0 t
 - Rainfed rapeseed 1.0 to 1.5t
 - Irrigated mustard 2.0 to 2.5 t
 - Rainfed mustard 1.5 to 2.0t

Cropping systems

- Fallow / millets / pulses – mustard
- Rice – rapeseed
- Intercroppings
 - Mustard + chickpea
 - Mustard + sugarcane
 - Mustard + barley / wheat / chickpea
 - Potato + mustard