

Niger
Guizotia abyssinica

Niger

- An oil seed for poor soils and coarse texture
- It is the crop suits in soils wherein all other crops are not possible
 - Like Horsegram in the tropics
- It is a minor oil seed cultivated in smaller area of the world

Importance of Niger

- Primarily (75%) for oil extraction
- Also used as food including confectionaries (18%) in India
- It is feed to birds in western countries
 - Export value for India
- Plant is feed to sheep but only silage to cattle
- Cake is valuable cattle feed
- Seed contains 35-40% oil
- Oil is pale yellow with nutty taste and a pleasant odour
- Keeping quality is poor due to oxidative rancidity
 - Oleic acid 38%, Linoleic acid 52%
- Oil is used for
 - Culinary purpose
 - For anointing the body
 - Manufacture of paints and soft soaps
 - Lighting and lubrication
- Niger oil is a good absorbent of fragrance
 - Used in perfume industries
- Oil a substitute for sesame oil in pharmaceutical purpose
- Niger based agar medium
 - to distinguish *cryptococcus neoformans*, a fungus that causes a serious brainailment

Distribution and area of Niger in the world

Major countries:

- World area is around 1.0 million ha
- India & Ethiopia posses the major area
 - In Ethiopia it is cultivated in water logged soils where most othercrops fail to grow

Other Countries:

- Sudan, Uganda, Zaire, Tanzania, Malawi, Zimbabwe, Pak, West Indies, Nepal, Bhutan & Bangladesh

Niger area in India (million ha & million t)

| States | Area | Production | Productivity |
|--------|------|------------|--------------|
|--------|------|------------|--------------|

| | | | |
|-------------|------|-------|-------|
| MP | 0.20 | 0.043 | 0.215 |
| Orissa | 0.15 | 0.047 | 0.309 |
| Maharashtra | 0.06 | 0.019 | 0.280 |
| Karnataka | 0.04 | 0.008 | 0.182 |
| All India | 0.52 | 0.150 | 0.286 |

Other states which also cultivate niger are Bihar, AP, Assam & WB

Origin

- From the highlands of Ethiopia
- From Ethiopia migrated to East Africa
- During the beginning of 2nd millennium BC to India

The Plant

- Annual dicotyledonous herb
- Seedlings
 - Pale green to brownish hypocotyls and cotyledons
 - The cotyledons remain on the plant for long time
- First leaf is paired and small
- Successive leaves are larger and opposite
- Leaves are sessile, lanceolate
- Softly hairy on both surfaces
- Dark green is usual color
- But lower leaves pale yellow
 - The stem is usually round, smooth to slightly rough
- Approximately 1-2 cm diameter
- Can grow up to 1.5 m
- Stem are hollow and break easily
- Color is green to reddish green
- Moderately branched
 - The capitula are surrounded by leafy involucre bracts
- Outer bracts being leaf like
- Inner smaller and finally merges with flattened paleas
 - The fruit is achene, typical of the composite, small.
 - Seed is 3-5mm length and 1.5mm width, lanceolate in shape
 - The testa is hard, glossy, and usually black
 - Normally 1000 seeds weighs 3-5g
 - There are 15-30 seeds/head
 - Sometimes more with immature seeds

The Climate

- It is temperate region crop
- Adapted to semi-tropical
- Performance is better between 500 -1000m elevation though suits up to 2500m
- Moderate Temp during growth
 - 18-23°C
 - >30°C growth adversely affected
 - Indian strains are less affected by temp compared to Ethiopian
- Frost will kill the young plant
- 1000-1300 mm RF can be tolerated but not >2000mm

- Peak flowering should not coincide with heavy rain
 - High wind – seed shattering
- Tolerates excess moisture and drought

The soils

- On wide range of soils
- Light textured soil but well drained heavy soil is also suitable
- pH 5.2 – 7.3
- Can tolerate water logging
 - Under waterlogged soil it develops aerenchyma cells
- It can grow in saline but increased salinity
 - Flowering gets delayed
- It can under dry soil
 - but not a dry land crop

Management

- Field
 - It is small seed hence requires fine seed bed
- Season
 - Aug-Sep
 - After a Kharif crop or early Rabi
- Varieties
 - No 71
 - IGP 76
- Spacing & Seed rate
 - 5 to 8 kg
 - Row width varies from
 - 20 to 30cm
 - Between plants
 - 10 or 15 cm
- Method of sowing
 - Most common is broadcasting
 - Drilling by seed drill is advanced and more useful
 - Depth of sowing 1-3cm
- Seed treatment
 - With fungicides
 - Void mixing with fertliers

Nutrient management

- Cultivated in poor soils with less input due to
 - Poor economy of the farmer
 - Poor economic return of the crop
- Response to fertilizers in rainfed is poor
- A schedule of
 - 20:20:0 is recommended
 - N in two splits, at sowing and 30 DAS
 - K is recommended in Karnataka @ 10kg
 - 40:40:0 is recommended in Orissa

Weed management

- Niger grows rapidly and covers quickly the surface
- One or two weedings – sufficient

- Dodder (Cuscuta) infested areas are there (Orissa)
 - Cuscuta free seeds
 - Herbicide Chlorpropham G at dodder germination @ 4kg /ha
 - Pronomide @ 2kg/ha as pre-emergence soil treatment or as foliarspray 20 DAS

Water management

- Very rarely grown as irrigated in India
- Crop is sensitive to moisture stress at early stage
- Schedule according to soil and climate
- Further research needed in this area
- Check basin or border strip is ideal methods

Maturity & harvest

- Duration varies 80-145 days
- Delayed harvest leads to shattering
- Seeds are loose in head, hence over maturity leads to grain shattering (25%)
 - When the leaves dry up, harvest it
- Harvesting like gingelly,
 - When the bud moisture is 45-50%
- Stacking in the floor for a week and drying and cleaning, as usual

Yield potential

- Normally 300-500kg but up to 1000kg/ha
- When intercropped
 - 400 kg with sunflower
 - 100 kg with sorghum

Cropping systems

- Sequential cropping
 - Little millet or finger millet – Niger
- Intercropping
 - Niger + sunflower (4:2)
 - Niger + soybean (2:1)
 - Niger + peanut (2:2)
 - Niger + blackgram (3:3)
 - Niger + castor

Cropping systems

- Preceding pulse is more remunerative than sole crops

Some more edible oil seeds

Oil Palm

Elaeis guineensis

- Originated in West Africa
 - But has planted successfully in tropical regions within 20 degrees of the equator
- An oil produced to 21.5million t in 2000
- Area grows annually by 2%
- World's largest producer and exporter - Malaysia - 47%
- Indonesia is the second largest world producer -36%

- Both are expanding their palm oil production
- Both pulp and seed contains oil
 - Pulp contains 20%
 - Seed 1.6%

Simarouba

Simarouba glauca

- Paradise tree
- Edible oil 42% by seed and 65% kernel
- Introduced into India

Olive (*Elaeagnus angustifolia L.*)

- Olive oil is an oil derived from the fruit of the olive tree, which originated in the Mediterranean area.
- It has a very high content of monounsaturated fats.
- Nowadays, olives are ground to tiny bits, obtaining a paste that is mixed with water and processed by centrifugation, separating the oil from the pomace (the other remaining substances).
- Edible commercial olive oil can be divided into several categories according to its chemical characteristics and the production method:
 - Extra Virgin Olive Oil,
 - Virgin Olive Oil, and
 - Olive Oil.
- The first two, virgin olive oils, are obtained only by physical extraction from the fruits.
- Non virgin olive oil is obtained by the chemical refining of a low-quality non-edible grade of virgin olive oil called "lampante" olive oil

The list enlarges this way:

- Corn oil
- Soybean oil
- Rice bran oil
- Coconut oil