Lesson 7

Castor

*Ricinus communis*

**Importance**
- It was poor man's crop
- Globalization changed the scenario
- Now it is one of the most commercial non-edible oil seed
- Its stem, leaves, seeds, oil and cake are useful
- Oil - variety of uses
  - Industrial
  - Lubrication- including ‘aero-engines’
  - Medicine- both human and veterinary
- Oil cake - manure
- Stalk - fuel or thatching
- Leaves - used for rearing silk worms
- Castor oil
  - Purgative as medicinally as cathartic & obstetrics
  - Skin ointment
  - Soothing agent to eye applied after removal of foreign bodies
  - As resins
    - Surface coating to household articles, furniture, refrigerators
    - Base materials for several paints, enamels & varnishes of super quality
  - Manufacture of leathers, adhesives, synthetic perfumes & flavors
  - Variety of rubber goods, hair oils
  - Clear bright colors in dying fabrics
  - For soaking raw skins in fur trade

**Origin**
- Indigenous to Eastern Africa
  - Most probably in Ethiopia
  - There are four large centres based on wild varieties
    - Irano-Afghanistan-USSR region
    - Palestine-SW Asia
    - India China
    - Arabian peninsular

**World scenario of castor – (million ha & million T)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Area</th>
<th>Production</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>1.05</td>
<td>1.00</td>
<td>0.95</td>
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<tr>
<td>China</td>
<td>0.24</td>
<td>0.28</td>
<td>1.17</td>
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<tr>
<td>Brazil</td>
<td>0.12</td>
<td>0.05</td>
<td>0.37</td>
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<tr>
<td>Thailand</td>
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<td>0.02</td>
<td>0.79</td>
</tr>
<tr>
<td>World</td>
<td>1.58</td>
<td>1.42</td>
<td>0.90</td>
</tr>
</tbody>
</table>
Indian scenario of castor – (million ha & million T)

<table>
<thead>
<tr>
<th>State</th>
<th>Area</th>
<th>Production</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gujarat</td>
<td>0.37</td>
<td>0.74</td>
<td>1.99</td>
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<tr>
<td>AP</td>
<td>0.24</td>
<td>0.06</td>
<td>0.25</td>
</tr>
<tr>
<td>TN</td>
<td>0.04</td>
<td>0.01</td>
<td>0.32</td>
</tr>
<tr>
<td>Orissa</td>
<td>0.02</td>
<td>0.01</td>
<td>0.31</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>0.04</td>
<td>0.05</td>
<td>1.36</td>
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<tr>
<td>Karnataka</td>
<td>0.02</td>
<td>0.02</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>India</strong></td>
<td><strong>1.58</strong></td>
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</tbody>
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The Plant

- Can be divided into 2 groups
  - Tall – Giant - like tree, tap roots
  - Short - Dwarf – tap root less apparent
- Stem
  - Round glabrous & covered with waxy bloom
- Leaves
  - Dark glossy green
  - Palmate with 5-11 lobes
- Inflorescence
  - The capsule contains three seeds
  - Seeds may vary greatly in size
  - 1000 seed may vary from 100 to 1000 g but most dwarf weighs around 300g
  - Inflorescence
    - Pyramidal raceme – ‘spike’ or candle
    - Male flowers in lower raceme
      - Number influenced by climate
      - High temp causes maleness
    - Female flowers in upper
    - May reach 100cm
    - Flowering may continue
    - Fruit is globular capsule, spiny to some degree, becomes hard & brittle when ripe
    - Shattering at maturity in giants but not in dwarf

Climate

- Hardy perennial
- Adapted to tropics to sub-tropics
- Now grows under warm temperate
- Temp ranging from 20-26°C with low humidity, long, clear, summer days throughout the growth favors high yield
- Frost free for dwarf is must
- It is long day crop
  - Short day (<9hrs/day) increases male flowers ratio
- Drought tolerant since deep rooted crop
Soil
- All soils except clay and poorly drained
- Grows well in light sandy soils
- Deep moderately fertile with acidic (pH 5.0 to 6.5) are more ideal
- It can tolerate up to pH 8.0
- Soil with high fertility undesirable since excessive vegetative growth & poor yield
- It can be in soils where other commercial crops are not possible

Filed preparation
- Deep ploughing is beneficial for rainfed crop for moisture conservation
- Chiseling in sandy soils
- Beds and channels in rainfed crops
- May be ridges and furrows in irrigated

Season
- Onset on SW monsoon
- Depends upon the date of receipt in different states
- During winter when the soil temp is <10-12°C

Method of sowing
- Sowing behind the furrows –in AP
- Dibbling in lines
  - May be placed between 5-6cm
  - Germination is epigeal, can break surface crust also

Varieties
- During 70’s
  - SA 2, V 19 & RC 6
- Hybrids
  - GCH 3, GAUCH 1, GCH 2
- In TN
  - SA1, 2, TMV 4, 5, 6, TMVCH 1, CO 1

Spacing (cm)
- 90 x 90
- 90 x 60
- 60 x 45
- 60 x 30

Seed rate
- 10kg depending upon seed weight and spacing

Manuring
- In TN
  - 30:15:15 kg NPK
- In Gujarat
  - For rainfed - 40:40:0
    - N in two equal splits
    - Basal + 30-35 DAS
Irrigated - 40:40:40 as basal
- + 10 kg N after each picking
- from 90DAS at 30 days interval
- There is N usage up to 150 kg in Gujarat

Irrigation
- Mostly as rainfed
- During prolonged drought
  - 2-3 supplemental irrigations
- Rabi & Summer crops require
  - 6-8 irrigations
  - Less number of irrigations in heavy soils
  - High moisture during maturity leads to
    - New leaves and delaying maturity

Weed management
- Weed free situation is 45-50 days
- Early suppression by weeds
  - Intercropping is a solution
  - Summer ploughing, deep ploughing are to reduce the weed
- Herbicides
  - Fluchloralin 1.0 kg PPI
  - Pendimethalin – 1.5 kg PE (1-2 DAS)

Maturity and harvest
- Harvesting in stages
- 2-6 stages depending upon duration and spike opening
- Capsules are picked when the spike turn yellow to black
- Drying
  - Sun drying the capsules and threshing

Yield
- Yield
  - 0.8 to 1.0 t in rainfed and
  - 1.5 to 2.0 t in irrigated
- Oil yield 50%
  - Oil extraction
    - Kernel pressing followed by solvent extraction

Cropping systems
- Crop rotation is very useful to control wilt
- Castor after pulse
- Castor followed by winter wheat
- Intercrops
  - Castor + peanut 1:3
  - Castor: blackgram 1:3
  - Castor : Pigeonpea 1:1