

L07

Crop 10
Pearlmillet
Pennisetum glaucum

- Origin – Africa from where it has spread to India
- Out of 32 sp only two are known outside
 - *P. glaucum* – Pearlmillet
 - *P. purpureum* - Elephant grass – for fodder
 - Earlier *P. purpurea*
- Importance
 - Mineral rich cereal
 - Protein rich (10.5 to 14.5) with higher level of essential amino acids
 - They possess biological value similar to wheat & rice
 - It is staple food for 100 million
 - It is also a good forage crop
 - It is also grown as pasture crop
- World Area –as per 1990
 - 22.0 million ha
 - Drier region of the world
 - India & Africa (Nigeria, Niger, Mali, Chad, Tanzania, Sudan & Senegal)
 - Small areas in USA, S. America, Canada, Japan, Italy and Australia for fodder
- Indian Area –as per 1990
 - 10.6 in 1961 to 10.4 million ha in 1997
 - Predominantly in Rajasthan
 - Rajasthan 5.00
 - Maharashtra 1.67
 - Gujarat 1.21
 - UP 0.95
 - Haryana 0.50
- Ecological Zones
 - Zone I - Adequate RF & fertility
 - Punjab, UP, Delhi, Haryana, MP
 - Zone II – Limited RF heavy to light loamy soil
 - Gujarat, Maharashtra & MO
 - Zone III – Low RF & light soil
 - Karnataka , N -C A.P & Rajasthan
 - Zone IV – Limited but well distributed RF
 - TN & Coastal A.P
- It is warm weather annual plant
- Root system like sorghum
 - Seminal, adventitious and prop roots
- Drought withstanding mechanism

- Deeper root system
 - Efficient photosynthetic system
 - Rapid transfer of food materials from leaves to grain
- Leaf sheaths are open & hairy
- Leaf blades are flat
- Stigma comes out several days before the anthers appear
- The anthers emerge after the style dry
- As a rule highly cross-pollinated crop
- Climate
 - Rainfall of 400-750mm
 - Mostly Arid & Semi-Arid regions
 - For vegetative growth moist weather & medium RF is sufficient
 - Temp are 28 to 32° C is optimum for vegetative growth
 - Higher temp at this stage induces early flowering
 - Pearl millet does not resist drought but cut shorts its life cycle and comes flowering early under adverse conditions
 - Rainfall during flowering & grain formation– poor grain setting
 - Rain at grain maturity – ergot disease due to high humidity & low temp.
 - Hence optimum time of sowing is very vital for this crop
- Many improved Hybrids & good open pollinated varieties
 - In TN
 - X 6, X 7, CO 7, WCC 75(World Cumbu Composite)
 - COH 8, K 3 etc
 - CO 9 is a good fodder variety . Its combination with CO 5 cowpea is a specialty
 - Some identified varieties for north
 - Pusa 23 (MH 169), Pusa 322, ICMH 451, ICHM 356
 - HHB 60, 67, 68, 50
 - RHB 30, 90
 - MH 605 (Pusa 605), MH 790, MH 782
- Soil
 - Loamy sands to loams, well drained, non saline and non-alkaline are more suitable
 - Sensitive to water logged areas
- Field preparation
 - Moisture conservation practices, summer ploughing, deep tillage once in three year, are essential
 - Fine and smooth seed bed free from clods
 - Free of termites and ants
- Sowing
 - Optimum time plays vital
 - Delay in sowing leads to disease and reduced grain yield
 - Mid July is more suitable – onset of monsoon in Rajasthan
 - In TN it is sown in two monsoons Jun-July and Sep-Oct and also in summer

- Seed treatment is important
- Seed rate
 - 4-5 kg if sown behind country plough
 - 3.75kg for nursery cum transplanting
 - Transplanting is suitable for delayed sowing
 - 500 m² nursery
 - 15-18 days old seedlings
 - Optimum population
 - 175,000 to 200,000
 - 45 cm row for certain varieties it may be less than 45(Co 7)
 - In between plants – it is decided after thinning
 - It may be by ‘inter-ploughing’
 - For irrigated crops 15cm between plants may be given
- Weed management
 - Manual weeding is costly affair
 - Hence inter –cultural operation with machinery is more useful to reduce the weed and also plant density
 - To increase tillering thinning is must
 - Herbicides pre-emergence
 - Atrazine 0.25 kg
 - Pendimethalin if intercropped with pulses
 - In addition a manual weeding can also be
- Nutrient management
 - Compared to sorghum and maize N & P removal is less but K is high
 - Fertilizer schedule
 - May be based on soil test
 - Irrigated
 - Hybrids : 80:40:40
 - Varieties : 70:35:35
 - Rainfed
 - Low rainfall : 40:30:30
 - Moderate to high : 60-80:40:40
 - N in 2 splits and P & K as basal
 - N may be at basal and 15DAT / 30DAS
 - Higher N application needs balanced P also
 - Micro-nutrients
 - Zn 25 kg
 - Fe 12-5 to 25.0kg for deficient soils
 - FYM 5t
 - Bio-fertilizers seed and main field application
 - Azospirillum & azotobacter
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- Bio-fertilizers seed and main field application
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- Water management
 - Highly drought evading crop
 - Requires much lower water than any cereals
 - 250-350mm is sufficient
 - Utilization of rain water depends up on
 - Type of soil
 - Organic matter content and
 - Leveling of the field
 - Though it is rainfed crop this crop requires moisture at anthesis & flowering stages
 - 3-4 irrigations is more than sufficient to get good yield
- Moisture conservation practices to pearl millet cultivation
 - Deep ploughing once & 3-4 ploughing before sowing
 - Ridges and furrow system
 - Application of FYM 5t/ha
 - Uses of mulches to reduce 'E'
 - Uses anti-transpiration materials – like kaolin, PMA, Atrazine
 - Seed treatment
 - Removal of 1/3 upper part of the seedlings to minimize 'T'
 - Mid-season correction if drought occurs
 - Appropriate weed control measures
 - Intercropping with legumes etc
- Cropping systems
 - Mostly single crop per annum in Rajasthan
 - Since mono-cropping is not advisable alternating with legumes
 - In more rainfall areas it is followed with a Rabi crop
 - Rabi crops are winter cereals
 - Intercropping is also possible in these areas with pulses and oilseeds
- Harvesting and grain quality
 - At physiological or when the grain moisture is 15-20%
 - The ear heads are separated and dried and threshed
 - Threshed grains should be dried to 12-14% moisture
- Grain yield
 - Irrigated 3.0 to 3.5 t
 - Rainfed 1.2 to 1.5t/ha
- Use of nitrogenous fertilizers helps to realize protein potential