2010-11

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION
B.Sc. (Agri.)

17

Semester	: III(New)	Academic Year :	2010-2011
Course No.	: AGRO-235	Title :	Field crops-I (*Kharif* crops)
Credits	: 3 (2+1)	Total Marks :	80
Day & Date	:	Time :	3 Hrs.

Note : 1) Solve Any Five questions from SECTION 'A'.
2) All questions from SECTION 'B' are compulsory.
3) All questions carry equal marks.
4) Draw neat diagram wherever necessary.

Model Answer Paper
SECTION "A"

Q.1 Explain in detail the cultivation of *kharif* sorghum on following points.

Ans. **1. Seeds and sowing**

1. Selection of seeds : Certified and recommended cultivars with known germination % and purity.
2. Seed treatment : 300 mesh fine sulphur @ 4 gm/kg of seeds to avoid smut disease.
3. Sowing time : Onset of monsoon upto 7th July.
4. Sowing method : Drilling
5. Spacing : 45 cm X 15cm
6. Seed rate : 7.5 to 10 kg/ha
7. Sowing depth : 5-7 cm

2. Fertilizer management

FYM or compost @ 6-8 t/ha.
The recommended dose of fertilizer is 80:40:40 NPK kg/ha.
Basal dose : 40:40:40 NPK kg/ha at the time of sowing
Top dressing : 40 N kg/ha at 30 DAS

3. Intercultivation

Three hoeing and 1-2 hand weeding, spraying of atrazine @ 1 kg a.i./ha as pre-emergence in 1000 lit. of water. Critical crop-weed competition is 15-45 DAS.

4. Plant protection

Pest : Stem bore, shootfly, midgefly, leaf roller
Control measure : spraying of endosulphon 35 EC, 14 ml in 10 lit. of water
Diseases : Grain smut, loose smut, downey mildew, charcoal rot
Control measure : Seed rtreatment with 300 mesh fine sulphur/Thirum/Captan @ 3 to 4 gm/kg of seeds.

5. Economic importance

1. Grain is eaten by human beings in the form of rotti.
2. Grains are also used as parched and popped grain.
3. It is also used to fed to cattle, poultry, swine.
4. Grains are used in preparation of alcohol and beer, medicinal purpose like penicllin
5. Seed is a good source of ethanol.

Q.2 Discuss in detail the cultivation of pigeonpea on following aspects.

Ans. 1. Seed bed preparation

One deep ploughing upto 20-25 cm followed by clod crushing then followed by 2-3 harrowing. Add FYM @8-10 t/ha at last harrowing.

2. Varieties : Recommended of the region.

3. Seeds and sowing :

1. Selection of seeds : Certified and recommended cultivars with known germination % and purity.
2. Seed treatment : Thirum @ 2-3 gm/kg of seeds or Bawistin @ 1 gm/kg of seeds followed by Rhizobium + PSB culture treatment @ 250 g/10 kg of seeds.
3. Sowing time : June-July.
4. Sowing method : Drilling
5. Spacing : 45 cm X 15cm on light to medium soil and 60 cm X 20cm on black cotton soil
6. Seed rate : 12-15 kg/ha for sole crop
   5-6 kg/ha for inter crop
7. Sowing depth : 5-7 cm

4. Cropping systems

Central peninsular region	: Sorghum + Pigeonpea
Western Ghat Zone	: Pearl milet + Pigeonpea
Rajasthan	Maize + Pigeonpea
Bihar and parts of West Bengal	: Rice + Pigeonpea
Western peninsular	: Groundnut + Pigeonpea
M.P. and U.P.	: Soybean + Pigeonpea

Black cotton and heavy soils of Central India : Cotton + Pigeonpea

5. Harvesting and yield

When 2/3 part of pod turns brown, cut plants with sickle at 7.5 to 25 cm above ground. Plants are allowed to dry for 2-3 days. Threshing is done by beating with stick. Pod grain ratio is 50-60 %. Clean seed is sun dried for 2-3 days to reduce moisture at 10-11 %.

Yield : 20-25 q/ha for sole crop
10-12 q/ha for inter crop

Q.3 Describe in detail the cultivation of Soybean on following points.

Ans. 1. Seeds and sowing

1. Selection of seeds : Certified and recommended cultivars with known germination % and purity.
2. Seed treatment : Thirum @ 2-3 gm/kg of seeds or *trichoderma viridae* @ 5 gm/kg of seeds followed by Rhizobium + PSB culture treatment @ 250 g/10 kg of seeds.
3. Sowing time : June-July.
4. Sowing method : Drilling
5. Spacing : 45 cm X 5 - 10cm
6. Seed rate : 75 kg/ha for sole crop
7. Sowing depth : 5 cm

2. Seed bed preparation

One deep ploughing upto 20-25 cm followed by clod crushing then followed by 2-3 harrowing. Add FYM @8-10 t/ha at last harrowing.

3. Varieties : Recommended of the region

4. Fertilizer requirement

Apply FYM or compost @15-20 t/ha

The recommended dose of fertilizer is 30:60:30 NPK kg/ha. Apply total dose dose at the time of sowing as a basal below the seed.

5. Harvesting and yield

The crop is to be harvested at physiological maturity. Change in colour of more than 90% of pods and seed have 30% moisture at this stage, harvesting is done. The plants are cut close to the ground and dried in sun for 2-3 days. The dried crop is threshed.

Yield : 30-35 q/ha.

Q.4 Explain in detail the cultivation of Cotton on following points.

Ans. 1. Ecology

Climate : Optimum temperature for germination is 15^{0}C, for vegetative growth is 21-27^{0}C, for fruiting and boll development is 27^{0}C, warm days and cool nights, well rainfall distributes rainfall of 500-700 mm

Soil : The Ph is 5.5 to 8.5.

Rajasthan : Sandy soils.

Indogangetic plains : Alluvial loam soils.

M.P., M.S., A.P. : Fertile black cotton soils.

A.P., T.N. : Red lateritic soils

2. Seed bed preparation

One deep ploughing upto 20-25 cm followed by clod crushing then followed by 2-3 harrowing. Add FYM @8-10 t/ha at last harrowing.

3. Varieties : Recommended of the region

4. Fertilizer management

Cotton	Rainfed *deshi* and improved variety			Rainfed hybrids			Irrigated cotton		
Kg/ha	N	P	K	N	P	K	N	P	K
At sowing	25	25	25	40	40	40	20	50	50
Top dressing at 30 DAS	25	--	--	40	--	--	40	--	--
Top dressing at 30 DAS	--	--	--	--	--	--	40	--	--
Total	50	25	25	80	40	40	100	50	50

Basal dose of fertilizer should be given by drilling method and top dressing of urea by ring method. Under rainfed condition, 2% urea spraying as foliar application is recommended.

5. Economic importance ;

1. Cotton seed contains 20% oil , 20% protein, 20% vitamins and minerals.
2. Residual oil cake is used for cattle feed.
3. It is also used for making soap, explosive, cosmetics, rubber plastos, water proofing materials, insecticides and fungicides etc.
4. Hull (seed coat) is used as cattle feed.

Lint is used as surgical cotton for dressing, absorbent cotton, automobile and furniture padding, textile purpose, special grade paper, cell phone, films, linoleum

5. Straws are used for thatching purpose, hard boards, paper and fuel.

Q.5 a) **Prepare a leaflet on finger millet cultivation**

Ans. In India, finger millet is the most important crop among small millets.
Among the small millets, finger millet has the highest av. Productivity in India.
Finger millet can retain its viability for about 4 months under conditions of low land rice.
Optimum sowing time for *kharif* finger millet is June-July.
Seed treatment with Captan @ 3gm/kg of seed can effectively control the blast disease.
Drilling is the best method for *kharif* rainfed crop. While irrigated crop is established by transplanting.
Spacing of 20 X 10 cm2 with a seed rate of 10 kg/ha for drilling and 4 kg/ha for transplanting.
20-30 days old seedlings are ideal for transplanting.
Fertilizer dose for finger millet is 60:40:30 NPK kg/ha.
Critical stages for soil moisture stress are tillering, panicle initiation and grain development.
Herbicides like pendimethalin as pre-emergence @ 0.75 to 1.5 kg a.i./ha can effectively control the weeds.
Mature earhead are harvested in 2 or 3 pickings to avoid shattering and bird damage.
Yield is about 20-25 q/ha.

b) Describe in the brief causes for low production of fodder in India.

The area and production of fodder crops is very low due to increase in human population in India.
The area of fodder crops is neglected during green revolution.
Due to the country faces serious crisis of oilseeds and pulses, the area of fodder crops is neglected.
There is no research for boosting the productivity and quality of fodder crops.
The fodder crops are grown only on marginal and waste lands.
Unawareness of fodder preservation techniques like silage making, hay making etc.

Q.6 **Describe in detail the cultivation of maize for grain purpose on following aspects.**

Ans. **1. Ecology**

Climate: Warm weather, short day plant, C-4 group
Optimum temperature for germination is 21^0C, for vegetative stage is 32^0C, for flowering and ripening is 27^0C

Annual rainfall requires 60 to 75 cm. It needs bright sunshine days.

Soil : It is adopted to well drained sandy loam to silty loam soils. This crop is very sensitive to water logging condition and Ph is 5.5 to 8.0.

2. Seeds and sowing

1. Selection of seeds : Certified and recommended cultivars, hybrid seeds and seeds of composite with known germination % and purity.
2. Seed treatment : Thirum @ 3 gm/kg of seeds to avoid seed and soil borne disease.
3. Sowing time : June- July.
4. Sowing method : Drilling or dibbling
5. Spacing : 60 cm X 30cm, 60 cm X 15cm
6. Seed rate : 15 kg/ha
7. Sowing depth : 5-7 cm

3. Intercultivation

Two-three hoeing and 1-2 hand weeding, last intercultivation should be done at 8 to 10 weeks and light earthing up may be done to give support, Critical crop-weed competition is 30-45 DAS.

spraying of atrazine or simazine @ 2.5 kg a.i./ha as pre-emergence in 1000 lit. of water and post-emergence application of 2,4-D @1.5 to 2.0 kg/ha are essential to keep the crop weed free.

4. Varieties: Recommended of the region

5. Harvesting and yield

Cobs mature earlier than stalk. When leaves turn yellowish, cob-sheath turns brownish and grain becomes hard, cobs become ready to harvest. Cobs are picked from stalk. Cobs are dried for 3-4 days grains are separated by maize Sheller. At harvest, grain should not contain more than 20% moisture.

Yield: Average yield of grain is10-15 q/ha and under improved condition it may be upto 25-30 q/ha.

Q. 7 Write short notes on (Any two)

1. Ecology and irrigation management in groundnut

Climate: it is a tropical crop which requires long and warm growing season. Optimum temperature is 25-30°, abundance of sunshine, warm temperature is suitable. Well distributed rainfall is 500-1000 mm.

Soil: it should be well drained, loose, friable, sandy loam, well supplied with calcium and moderate amount of organic matter. Sandy and loam soils are more suitable than clay. It grows well in slightly acid soil while saline soils are unsuitable.

Irrigation management: it require 60-65 cm water. In kharif season, if long dry spell occur 1 or 2 irrigations are given at pod formation stage. One light pre-sowing irrigation is given for better germination of seed and further frequency of irrigation ranges between 8-12 days. The critical growth stages are

Establishment	: 10-20 DAS
Vegetative	: 25-35 DAS
Flowering and pegging	: 35-50 DAS
Pod formation	: 50-75 DAS
Pod development	: 75-90 DAS

2. Constraints of oilseed production

1. About 90-95% area under oilseed remains rainfed
2. Soil fertility in such areas is very poor
3. Majority of oilseed growers are mostly small and marginal. They adopt low standard of management technology like seeds, lower doses of inputs like fertilizer, plant protection material.
4. There is a scarcity of short duration, high yielding, input responsive, drought resistant, insect, disease resistant varieties.
5. Oilseed crops are grown either mixed or inter crop.
6. Marketing of oilseed is highly unregulated resulting into large fluctuations in price.
7. Oilseed crops are not sown timely.

3. Retting and Extraction process in jute

Retting is biological approach, with which the fibres in the bark get loosened and separated fro0m the woody stock. It is microbial process affected by various organisms. It is done best in shallow canal with slow running water or in tanks with 2m depth. Harvested bundles are kept in 30-60 cm deep water for 3-4 days before the entire bundle is topped. Bundles are placed side by side in 2-3 layers and tide together. They are covered with aquatic weeds and secondary tide with rope at corners. Concrete blocks are kept on it to submerged 10 cm below the surface water. Retting is best at 34oc. Stems are examined 8th day on holds. If the fibre slips easily from the wood on pressure from the thumb and finger retting consider completely.

Extraction : Fibres should be extracted gently. Keeping the stocks in water and beating with wood sticks should be avoided as it spoils the fiber quality. Extracted fibre should be dried in mild sun over a bamboo frame for 2-3 days.

SECTION "B"

Q.8 Fill in the blanks.

1. Soybean contents **42%** protein
2. **International Rice Research Institute** is the full form of IRRI.
3. Sunhemp for fibre purpose should be harvested at **pod formation** stage.
4. Branches bearing bolls in cotton are termed as **sympodias.**
5. **Linoleic acid** is the major fatty acids in Niger seed .
6. **Jute** crop is said to be golden fibre of India.
7. The seed rate of paragrass is **10000 sets/ha.**
8. Castor belongs to family **Euphorbiaceae.**
9. Leguminous crops always require lower N dose.
10. Origin of Groundnut is **Brazil (South America).**

Q.9.a. Complete the following table

Sr, No.	Name of crop	Seed rate (kg ha^{-1})	Variety
1	Moth bean	25-30	Recommended of the region
2	Foxtail Millet'	8-10	
3	Sunhemp	15	
4	Pearl Millet	2.5-3.0	
5	Kodo Millet	25	

b) State True or False

1. In Maharashtra the area under *rabi* sorghum is more than *Kharif* sorghum - True
2. Silking is one of the growth stage of Pearl Millet - False
3. Niger belongs to family Compositae - True
4. *Gossypium hirsutum* is popularly known as Indian cotton - False
5. The seed rate of guinea grass is 500 sets / ha - False

Q.10 Match the pairs.

A	B
1. Cowpea	*Vigna sinensis*
2. Black gram	*Vigna mungo*
3. Niger	*Guizotia abyssinica*
4. Cotton	Spotted Bollworm
5. Horse gram	*Dolichos biflorus*
6. Sesamum	Pedaliaceae
7. Foxtail Millet	*Setaria italica*
8. Kodo Millet	Kodra
9. Fodder Maize	African Tall
10. Sunhemp	*Crotolaria juncea*

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