2009 - 2010

24

MODEL ANSWER

MAHARASHATRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE

SEMESTER END EXAMINATION

B.Sc.(Agri.) 2009-10

Semester : III | Academic Year : 2009-2010

Course No. : AGRO-235(New) | Title : Field Crop(I) Kharif crops

Credit : 2+1=3

Day & Date : | Time | Total Marks : 80

Note : 1.Solve ANY FIVE questions from SECTION "A".
2. All question from SECTION "B" are compulsory
3.All question carry equal marks.
4.Draw neat diagram wherever necessary.

SECTION "A"

Q.1. A farmer desires to grow Soybean crop advice him on the following aspects.
1. Soil and Climate 2. Seed and sowing 3. Selection of varieties
4. Nutrient management 5. Diseases and pest management

1. Soil and Climate :-

Soil: - Medium to heavy, well drained soils with pH ranging from 6.0 to 7.5 are most suitable. Sodic and saline soils inhibit germination of seed. Salty and sandy, bad drained soils are not suitable. Water logging is injurious to the crop.

Climate: - Soybean grows well in warm and moist climate. A temperature of 26.5 °C to 30 °C appears to be the optimum for most of the varieties Soil temperature of 15. 5 °C or more favour rapid germination and vigorous Seedling growth. The minimum temperature for effective growth is about 10 °C Soybean is a short day plant. In general it can be grown in tropical as well as Subtropical regions receiving rainfall 750 to 800 mm

2. Seed and sowing:-

The varieties of soybean are sensitive to photoperiod and require short day condition for flowering and therefore sowing time is important.

1. The optimum sowing time:-

for *Kharif* is First fortnight of June to 2nd week of July.

The last week of January to first week of February for *summer* season.

2. Seed treatment:-

a) seeds are treated with 1% mercurial compound or thiram or captan or Dithane M--45 as a preventive measure against seed borne diseases

b) *Trichoderma Viridae* @ 5 gm / Kg preventive measure against soil borne diseases

c) *Rhizobium* culture: - inoculation of *Rhizobium* culture @ 250gm/ 10 Kg seed is recommended for enhancing activity of nitrifying bacteria for fixation of atmospheric nitrogen

(P.T.O.)

3. **Methods of Sowing:** - Drilling
4. **Depth of Sowing:** - 4to 5 cm
5. **Spacing :-** For heavy soils – 45 X 5 cm
   For medium soils – 30 X 10 cm
6. **Seed rate :-** 75 - 80 Kg / ha

3. **Selection of varieties :-**

Varieties :-	Duration	Yield
1.MACS- 58	90-100	25-35
2.MACS – 124	90-100	25-35
3.JS – 335	90-95	25-35
4.P K – 1029	95-100	35-40
5.MACS – 450	90-95	25-35
6.D S – 228 (Phule Kalyani)	90-95	30-35
7.Monetta	85	15
8.Puja	105	20
9.Arti (MAUS-1)	105	25

4. **Nutrient management :-**
   Manures :-Application of 5 tones of FYM or Compost at last harrowing
   Fertilizers :- 50 Kg N/ha 75 Kg P_2O_5/ha at the time of sowing
5. **Diseases and pest management :-** The most common diseases occurring on soybean is
   1. Charcol rot :- it is caused due to the fungus *Rhizoctonia bataticola*
      Control measure:- Treat the seed with Thiram @1.5 g + carbendazim @ 1.5 g /.kg seed before sowing
   2.Alternaria leafspot:- it is caused due to the fungus *Alternaria alternata*
      Control measure:-
      1. use disease free seed
      2.Treat the seed with Thiram @1.5 g + carbendazim @ 1.5 g / kg seed before Sowing
   3.Anthracnose :- it is caused due to the fungus *colletotrichum truncatum*
      Control measure:-1. Treat the seed with Thiram @1.5 g + carbendazim @ 1.5 g / kg seed before sowing
      2.Foliar spray of Indofil M-45 @2.5 Kg/ha
   4. Bacterial blight :- caused due to *pseudomonas glycinea* on leaves, stem, petioles and pods
      Control measure:- 1. summer ploughing and use of certified seed
      2. foliar spray of Blitox 50 (0.3%) + streptocycline 0.1% is recommended
   5.soybean mosaic :- caused by soja virus1
      Control measure:- spray of monocrotophos 0.1% is recommended

(P.T.O.)

Pest :- The most common pest occurring on soybean is

1. Bihar hairy caterpillar:- it is a serious pest of soybean
   Control measure:- spray of Endosulfan35 EC or Quinalphos 25 EC @1.25 liter/ha + methyl dematon(Metasystox 25 EC) @ 1.25 litre/ha
2. Girdle beetle :- :- it is also the serious pest of soybean
   Control measure:-1. application of phorate 10 G (1.5 Kg a.i./ha)
   2. foliar spray of monocrotophos (0.04%) or Endosulfan 35 EC (0.07%) or Quinolphos 25 EC @1.25litre/ha
3. Leaf roller :- mostly occured in maharashtra amd M.P.
   Control measure:- spray of Endosulfan 35 EC or Quinolphos @1.litre/ha
4. Leaf minor:- mostly occured in maharashtra amd M.P.
   Control measure:- spray of Endosulfan 35 EC or Quinolphos @1.litre/ha
5. white fly :- Mostly occurred in UP
   Control measure:- spray of Endosulfan 34 EC 0.1% or Quinolphos 25 EC @1.litre/ha

Q.2. Describe in detail the cultivation of green gram on the following points
1. Land preparation 2. Seeds and sowing 3. Selection of varieties
4.Nutrient management 5.Harvesting and yield

1. **Land preparation** :- Green gram requires rough seed bed hence one deep ploughing (15 to 20 cm) followed by clod crushing and 2 to 3 harrowing are sufficient to make rough seed bed
2. **Seed and sowing**
   1. The optimum sowing time for *Kharif* is first fortnight of June.
      The second week of March to first week of April for the *summer* season.
   2. **Seed treatment :-**
      a) seeds are treated with 1% mercurial compound or thiram or captan or Dithane M – 45 as a preventive measure against seed borne diseases
      b) Trichoderma Viridae @ 5 gm / Kg preventive measure against soil borne diseases
      c) Rhizobium culture :- inoculation of Rhizobium culture @ 250gm/ 10 Kg seed is recommended foe enhancing activity of nitrifying bacteria for fixation of atmospheric nitrogen
   3. **Methods of Sowing :-** Drilling
   4. **Depth of Sowing :-** 3to 4 cm
   5. **Spacing :-** 30 X 10 cm
   6. **Seed rate :** 15 to 20 Kg /ha

3. **Selection of varieties :-**

Variety	Duration	Yield Kg/ha
Jalgaon 781	65-70	500-600 K
Kopergaon mung	60-65	1000-1200 K
P.S. –16	60-65	700-800 K
S-8	60-65	700-800 K
T-44 (pusa Vaishakhi)	60-65	600-700 S

(P.T.O.)

D-41-9	65	450-550 K
M.L.-9	70-72	560-600 K
T-1	60-62	700-800 K
Phule Mung – 2	65	900-950 K,S
Vaibhav	65-70	1400-1500 K
BPMR-145	65-70	1200-1400 K
AKM-8802	60-65	1000-1200 K

4. **Nutrient management:-**

manures :- Application of 6 to 8 tones of FYM or Compost at last harrowing

Fertilizers :- 20 Kg N/ha 40 Kg P_2O_5 /ha at the time of sowing

5. **Harvesting and Yield :-**

Harvesting and Threshing :- The crop matures in 65 to 70 Days. Harvesting is done by picking pods 10 days interval, for 2 times. The crop is harvested before it is dead ripe. The pods are dried and threshing is done . At some places entire plants are uprooted or cut with sickle , dried and threshing is done by trampling or beating the produce with stick.

Yield :- 500 to 600 Kg /ha

Q.3. Explain in detail the cultivation of sesame crop on the following points.

1. Soil and Climate 2. Seed and sowing 3. Selection of varieties 4.Nutrient management 5.Harvesting and yield

1. **Soil :-** - Sesame can be grown on vide range of soils, these are well drained soils. It is best in sandy loam soil with adequate moisture. Very sandy, acidic or alkaline soils are not suitable. It can be suitably grown in the soils having pH range of 5.5 to 8.0

Climate :-Sesame is a warm region of the tropics & sub tropics. It require fairly hot temperature during its growth to produce maximum yield. A temperature of 25 oC to 27 oC encourages rapid germination, initial growth & flower formation. Low temperature at flowering is undesirable which results in premature flower drops. It is extremely susceptible to water logging & heavy rainfall Frost is also harmful to this crop.

2. **Seed and sowing :-**

1.Time of sowing :-

sesame is cultivated in both Kharif and Rabi season. Kharif sesame is sown immediately after on set of monsoon (15 th June to first week of July) the delayed sowing of sesame crop beyond first week of July decreases the yield considerably.

2.Seed Treatment :- a) seeds are treated with 1% mercurial compound of thiram or captan as a preventive measure against seed borne diseases like root rot, bud necrosis and wilt

b) *Trichoderma Viridae* @ 5 gm / Kg preventive measure against soil borne diseases

(P.T.O.)

c) *Rhizobium culture* :- inoculation of *Rhizobium* culture @ 250gm/ 10 Kg seed is recommended foe enhancing activity of nitrifying bacteria for fixation of atmospheric nitrogen

3. Methods of Sowing :- Drilling , Broadcasting

4. Depth of Sowing :- 2to 3 cm

5. Spacing :-

Spacing :- 30x 15 or 45 x 10 cm

6.Seed rate Kg/ha :- 2. 5 to 3 Kg

seeds being mixed with well sieved FYM or Fine sand for proper distribution

3. **Selection of varieties :-**

Variety	Duration	Yield Kg/ha
No. 58-2	105-110	400Kg /ha
No.128	120	250 Kg/ ha
No.8	130	215 Kg/ ha
Phule Til no.1	90-95	585 Kg/ ha
JLT –7 (Tapi)	76-83	700 –800 Kg/ ha
JLT – 26 (Padma)	75 – 80	650-850 Kg/ ha
Madhavi	75	500-600 Kg/ ha
Punjab Til no.1	80	400 – 600 Kg/ ha

4.Nutrient management :-

Manures :- Application of 5 tones of FYM or Compost at last harrowing or 1.0 tones of Castor cake at the time of sowing

Fertilizers :- 50 Kg N/ha

25 Kg N/ha at the time of sowing

25 Kg N/ha at the 30 days after sowing

5.**Harvesting and Threshing :-**

Harvesting and Threshing: - At maturity leaves, stem and capsule turn yellow also the defoliation of leaves started at this stage. The capsule matures from base to upward. The plants are cut and tied in small bundles. They are dried and the seed is separated.

Q.4. Describe in detail the cultivation of peari millet on the following points
1. Land preparation 2. Seeds and sowing 3. Selection of varieties
4.Nutrient management 5.Harvesting and yield

1.Land preparation :- Bajra crop needs very fine and compact seedbed, because the seed size of this crop is relatively very small hence one deep ploughing (up to 10 – 15 cm deep) followed by 2 to 3 harrowing before last harrowing add 5 tones of FYM or Compost

(P.T.O.)

5. **Seed rate :-**

a)American cotton:-5 to 6 Kg /ha

b)Hybrid cotton :- 2.5 to 3 Kg /ha

6. **Spacing :-**

a) Medium soil :- 90 X 90 cm

b) Heavy soil :- 120 X 90 cm, 90 X 90 cm

Q(5) Cotton Cultivation

Manures:- 12 to 15 tones of FYM/ Compost before last harrowing

Fertilizers :- American cotton / Hybrid cotton :-

100 Kg N + 50 Kg P_2O_5 + 50 Kg K_2O /ha

50% N + 100% P & K at sowing

25% at one month after sowing

25% at the time of flowering

After care :- Thinning and Gap filling should be completed within 2 – 3 weeks from sowing.

Interculturing :- 2 – 3 hoeing and 2 to 3weeding should be done depending upon weed intensity.

Chemical weed control :- pre plant incorporation of Basalin @ 1.0Kg a.i./ha or Pre emergence application of Diuron @ 1.0Kg a.i./ha in 800 to 1000 liter of water is effective for controlling weeds.

Water management :- The water requirement of cotton is about 939.8mm

Cotton plant is very sensitive both to deficient as well as excessive soil moisture conditions. It is therefore , very important to maintain just adequate moisture in the soil at different growth stages of the crop. The water use by cotton plant is at the rate of about 0.1 inch or 2.5mm per day between emergence to square formation. 0.1 to 0.25 inches or 2.5 to 6.25 mm per day between square formation to first bloom and about 0.25 to 0.40 inches or 6.65 to 10.0 mm per day between first bloom to first open boll period.

Harvesting :- Cotton is harvested in three or four pickings as the bolls mature. Kapas or seed cotton is removed from the bolls in the field it self and care is taken to see that no leaf portion gets attached to the fiber. Clean picked cotton fetches Premium Price in the market. The harvesting period varies with the variety but Generally extends over about 8 to 10 weeks. It starts in October and extends up to December in Maharashtra. The middle pickings are the heaviest and best in quality. The last picking is usually of poor quality.

Yield :- American and Hybrid Cotton – 20 to 30 q/ha

Q.6. Prepare a leaf let on cultivation of fodder maize

Climate :- Maize is mainly grown in tropical and temperate region. However it is essentially a warm and humid season crop and in areas of mild climate it can be grown through out the year. It can be successfully grown where the night temperature does not go below 15.6 OC The most suitable temperature for germination is 21 OC And for growth is 32 OC. It can not with stand in frost at any stage of its growth. Maize can be successfully be cultivated in the areas receiving rainfall more than 750 mm

Soil :-Maize can be grown on wide ranges of soils. However, maize grows best on fertile, well drained medium to heavy textured soils. It can be successfully grown in the soils where pH ranges from 5. 5 to 7.5.The crop grown on river banks (alluvial soil type) Especially gives good yield of maize

Preparatory tillage :- ploughing (up to 20 – 25 cm deep) followed by 2 to 3 harrowing before last harrowing add 12 to 15 tones of FYM or Compost If maize is to be grown under irrigation for grain purpose the ridges and furrow are opened at the distance of 60cm and 75 cm apart in medium and heavy type of soil respectively.

Varieties for fodder purpose :-

1. Deccan double hybrid
2. Ganga-5
3. African tall
4. Vijay
5. Manjri composite
6. Ganga-3
7. Ganga safed-2

Methods of sowing :-

Drilling

Fodder :- 30X 10 cm

Depth of sowing :- Not more than 5cm

Seed Rate for fodder purpose :- 75 Kg/ha

Manures :- 12-15 Tones/ha of FYM/ Compost is applied at the time of land preparation

Fertilizers :- For fodder crop :- Kg /ha

	N	P_2O_5	K_2O
1.At sowing time	50	50	50
2.30Days after sowing	50		
Total	100	50	50

If the soil is deficient in Zinc, Zinc sulphate may be added @ 20 to 25 Kg/ha

After Care:-

Weeding and hoeing :- The crop growth at initial stage is slow and hence 2-3 hand weeding and 2 hoeing should be given at an interval of 12-15 days

Harvesting :- As a fodder crop, it is important to cut maize at the right stage i.e. when the cobs are just formed, because the feeding values goes down rapidly there after. Harvesting of maize at 50% flowering or tasselling stage approximately, 65 to 70 days after sowing produces nutritive fodder yield.

Yield :- 40 to 60 tones/ha

Q.7. Write short notes on (Any four)

1. .Dapog method of paddy cultivation2. Economic importance of castor
3. Stepping, Retting and Extraction of fibre from sunhemp 4. Retting in jute
5. Drum rolling in groundnut

1.Dapog method of paddy cultivation :-

This method has been introduced in India from Philippines. It is adopted in A.P. by some farmers. It saves almost half of the time in seedling raising. Twenty five to 30 sq. m. of area is enough for one hectare area (0.3%) . The seedlings raised in this method are delicate , thin, slender and short in height. In this method prepare 10 cm high raised bed near water source in the field or at any convenient place. Cover the surface area of bed with polythene sheets or banana leaves or empty gunny bags. Construct walls 5 to 7 cm high sides of seed bed. Treat the seed with 3% brine solution. Soak the seed in container for 24 hours in clean water. Then remove seed from water and put it on wet gunny bags, incubate the seed's in dark room for 36 to 48 hours. Stir seeds once in a day and wet them thoroughly, spread incubated seeds on Dapog bed i.e. on polythene paper or banana leaves@ 3 Kg/sq. meter. Press it gently with plank. Sprinkle water every morning and evening. Pressing and sprinkling of water should be continued for first 4 days. Afterwards keep seedlings wet by spraying water, seedling become ready within 14 days for transplanting. Do not pull out the seedlings. Lift the section of bed and roll like a mat and transport to transplanting field.

There are 3 to 4 seedlings should be transplanted per hill instead of 2

2. Economic importance of castor:-

1.Castor is an important industrial oilseed crop. Because of its deep root system , drought hardiness and quick growth , it finds a place of prestige in the cropping system of dry land agriculture in semi arid zones of India

2.Castor oil is valuable on account of its non drying and non freezing quality at low temperature hence it finds a number of uses foe domestic, medicinal, industrial purposes

3. Castor oil contains hydroxyl fatty acid (85 %) known a recinoleic acid

4. This recinoleic acid can be treated as dehydrated oil, this dehydrated oil is In demand for paints and varnishes because of its non yellowing quality.

5.Castor oil is the chief material for the production of sebacic acid which is the basic ingredient in the production of synthetic resins and fibers

6.Castor oil is used as a lubricant in all moving parts of machinery

7.Hydrogenated castor oil is used in polishes, ointment, waxes,printing ink, cosmetics, hair dressing, soaps and disinfectant

8.Castor oil is used as a purgative

9. In dying industry it is used for the preparation of turkey red

10. Castor oil is used in many veterinary uses. It is used externally as an emollient.

11. The castor oil cake is a valuable manure.

12. The castor oil cake is contains the poison substance ricin therefore it is unfit for cattle feed.

13. The oil cake contains 5.5 % N, 1.8 to1.9% P and 1.1% K

3. Stepping, Retting and Extraction of fibre from sunhemp :-

The bundles are brought to the nearest ponds, ditches, pools or stream or shallow canal or river with slow running water and arranged side by side to form a plat form in water for steeping. Then the bundles are covered with aquatic weeds like water hyacinth,

grass etc.and weighed down 10 –15 cm below the water by stone or concrete blocks care should be taken to see that while weighing the bundles do not touch the bottom of the retting tank.

Retting in slow running water is better than retting in stagnant water. This process is complete when the fiber is loose enough for extraction and easily separated from the sticks. This can be determined by examining 1 or 2 plants from the bundle after 2 to 3 days of retting. The period of retting may vary from 3 to 15 days depending upon the temperature of retting water and month of harvesting. The optimum temperature for retting is 21 to 27 oC

The extraction of the fiber of sun hemp is more difficult than jute. Therefore ,fiber is extracted single plant wise by breaking the lower end of the plant and then stripping upward from the bottom. After extraction , the peeled fiber should be washed thoroughly in clear water to remove the dirt and other adhering materials.

The fibers need to be squeezed to remove excess water and spread on bamboo rafts to dry in mild sun for 2 to 3 days . After drying the fiber is graded and bundled for marketing.

4. Retting in jute :- Retting is a process by which the fibers in the bark get loosened and separated from the woody stalk .It is a microbial process affected by various aerobic and anaerobic micro-flora. Retting is best done in a shallow canal with slow running clear water, where such facilities are not available, tank with a depth of about two meters are quite suitable. The harvested jute bundles should be kept standing in 30 60 cm deep water for 3 to 4 days before the entire bundle is steeped. Later on bundles of jute should be placed side by side usually in two to three layers and tied together. They are covered with aquatic weeds.The float is then weighed down with concrete blocks or kept submerged at least 10 cm below the surface of water. Retting is best done at 34 oC At the end of the 8 day onward, the reds (stem) are to be examined . If fiber slips out easily from the wood on pressure from the thumb and fingers, retting is considered complete. Over retting results in dazed week fiber.

5. Drum rolling in groundnut :- In case of erect type of Gr.nut the pegs which are formed only at the base of vines enter into the soil, which afterwards develop to pods. The pods also develop on the upper parts of the vine, where the flower born. Such pegs do not reach to the ground level due to more height from their base. Under such conditions, rolling of 200 liter capacity empty iron drum on erect type of Gr.nut helps in development of these pegs into pods. 55 to 70 DAS gives 15 % more yield. There should be sufficient moisture in the soil at the time of rolling of empty iron drum. This helps in increasing pod yield of Gr.nut.

soybean → B.T → glycine max L Merril.
family → Leguminaceae.
Asia.
groundnut → B.N → Arachis hypogaea L.
family → Leguminosecae
Brazil.
Sorghum → B.N → Sorghum bicolor
family → Gramineae
origin → central Africa

SECTION "B"

Q.8. Complete the table on following points

Crop	Seed rate Kg/ha	Yield q/ha
1. Finger millet	Broadcasting -12-15Kg/ha Drilling – 6-8 Kg/ha	Rain fed 10to 12 q/ha Irrigated 25 to 30 q/ha
2. Black gram	15 to 20 Kg /ha	10 to 12 q/ha
3.Barn yard millet	8 to 10 Kg/ha Drilling method	8 to 10 q /ha
4.Niger	5 to 6 Kg/ha	4 to 5q /ha
5.Sorghum	8-10 Kg/ha	40 to 45 q /ha grain

Q.9. Fill in the blank.

1. Protein content in Sesame is.....25...percent..
2. Maize crop is called as Queen of cereals
3. Botanical name of sorghum is *Sorghum bicolar* M.
4. The origin of groundnut is Brazil
5. Shanti is a variety of Pearl millet.crop
6. Botanical name of Pigeon pea is *Cajanus cajan* L.....
7. Cotton belongs to -Malvaceae- family
8. Vipula is a variety of Pigeon pea..crop
9. Botanical name of Paddy crop is *Oryza sativa*, L
10. Soybean crop is called as Wonder crop

Q.10 Match the pair

A	B
1. JS-335	a) Soybean
2. JLT-26(Padma)	b) Sesame
3. Hydro cynic acid	c) Sorghum
4. IGP-76	d) Niger
5. JL-220	e) Groundnut
6 Castor	f) *Ricinus communis*
7. Indrayani	g) Paddy
8. Ganga-11	h) Maize
9. Napier grass	i) *Penisetum purpurium*
10. Guinea grass	j) *Panicum maximum*

cotton → B.N → Gossypium spp.
family → malvaceae.

Black gram → B.N → vigna
family → L