



**FACULTY OF AGRICULTURAL SCIENCES
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SST 221, PRINCIPLES OF SEED TECHNOLOGY**

Seed Production of Bajra

Seed Production of Synthetics & Composites

Land requirement: Land to be used for seed production of bajra open pollinated varieties should be free from volunteer plants

Isolation requirement: Bajra is predominantly a cross pollinated crop with 80% cross pollination due to protogynous condition. Therefore for pure seed production the seed field should be isolated by 400 and 200 m for foundation and certified seed respectively from other varieties of bajra and from same variety not confirming to varietal purity requirements.

Brief Cultural Practices: Obtain appropriate class of seed from the source approved by seed certification agency. Bajra can be directly sown in the field or a nursery can be raised and transplanted after 20-25 days. The seed rate required is 3-4 kgs/ha.

Transplanting is generally useful under following conditions.

1. there is shortage of seed and when assured yield is required.
2. when the main field is occupied by previous crop, we can save upto 1 month time.

Number of field Inspections: A minimum of three inspections shall be made as follows;

1. The first inspection shall be made before flowering preferably within 30 days after planting to determine isolation, volunteer plants, offtypes, downy mildew incidence and other relevant factors
2. The second inspection shall be made during 50 % flowering to check isolation, offtypes, downy mildew/green ear (*Sclerospora graminicola*) and other relevant factors.
3. The third inspection shall be made at maturity and prior to harvesting and in order to determine the incidence of downy mildew/green ear disease, ergot, grain smut and to verify the true nature of plant and other relevant factors.

Roughing: Rogue out offtypes and volunteer plants before they begin to shed pollen. The rogues must be cut from the base or uprooted. The offtypes can be identified based on morphological characters like leaf shape and color, hairiness, anthocyanin pigmentation on the stem and leaves, plant height etc. at harvest offtypes can be identified by panicle characters. Remove the plants affected by green ear, ergot and grain smut disease from time to time.

Harvesting: Bajra should be harvested when the grains are fully mature. After harvesting remove the ear heads infected with ergot and green ear disease before drying and threshing. Care should be taken during harvesting, threshing and drying to avoid mechanical mixtures.

Seed yield : Depending upon the variety and the management practices adopted the seed yield may vary from 20 –25 Q/ha.

Hybrid seed Production

The hybrid seed in bajra is produced by utilizing cytoplasmic genetic male sterile system. The cytoplasmic male sterile source used in bajra is Tift 23A identified by G.W.Burton. The hybrid seed production in bajra can be discussed under to heads

1. Maintenance of parental lines (A-line, B-Line and R-line)
2. Commercial hybrid seed Production (Crossing A X R)

Maintenance of A-line or male sterile line : For maintenance of A-line it has to be crossed with male fertile, non-pollen fertility restoring strain i.e. B-line in an isolated plot. The usual planting ratio adopted is 4 lines of A-line and 2 line of B-line with 4-6 borders of B-line around the field.

Isolation Requirement:

Isolation required is 1000 m from other bajra fields.

Time isolation is not permitted in bajra.

Cultural practices:

Obtain appropriate class of the seed from the source approved by seed certification agency. The seed rate required for drilling is 1.5 Kgs/ha of A-line and 0.75 kgs /ha of B-line, for transplanting the seed rate required is 600-650 gms of A-line and 200-300 gms of B-line. The spacing adopted is 70-90 cms between the row and 20-25 cm within the row. Follow the recommended package of practices as that of normal cultivation.

Number of field Inspections:

A minimum of four field inspection shall be made as follows;

1. The first inspection shall be made before flowering preferably within 30 days after planting to determine isolation, volunteer plants, offtypes, planting ratio, planting errors, incidence of downy mildew and other relevant factors
2. The second and third inspection shall be made during flowering to check isolation, pollen shedders, offtypes, downy mildew/green ear (*Sclerospora graminicola*) and other relevant factors.
3. The fourth inspection shall be made at maturity and prior to harvesting and in order to determine the incidence of downy mildew/green ear disease, ergot, grain smut and to verify the true nature of plant and other relevant factors.

Roughing: Roughing should be done frequently to produce high quality seed.

Following precautions should be taken while rouging.

1. Rouging should be started before flowering to avoid contamination with foreign pollen
2. Remove offtypes and volunteer from seed parent and pollen parent by uprooting to prevent re-growth.
3. Female parent rows should be rouged daily during flowering to remove pollen shedders
4. Remove plants in between the lines or male plants in female rows and vice-versa. Remove the plants affected with green ear, ergot and grain smut.
5. Remove offtypes and volunteers from within the isolation distance.
6. Before harvest rouging should be done based on seed characters.

Harvesting: Harvest the male rows first and keep them separate to avoid mechanical mixture. Then harvest the female rows and sort out the undesirable heads and reject them before drying and threshing.

Seed Yield : Depending on the potentiality of the inbred line and the management practices adopted the seed yield may be 3-4 Q/ha.

Maintenance of restorer line: It is produced in an isolated field just like normal varieties as it is male fertile, by following the standards given for maintenance of A-line.

Commercial Hybrid seed Production:

The hybrid seed is produced by crossing male sterile line (A-line) with the restore line in an isolated field. The planting ratio adopted is 4 lines of A-line and 2 -lines of R-line.

Isolation requirement: 200 m from fields of other varieties of bajra and 5 m from fields of other hybrid seed production plots having the same male parent.

Cultural practices: the spacing and seed rate are same as that of maintenance of male sterile line. If male and female parents of different durations then the sowing dates should be adjusted accordingly for proper synchronization of flowering between male and female parent. If the difference in flowering is 3-4 days it can be adjusted by cultural practices. The parent, which is late, should be sprayed with 2.0 % urea solution, which enhances flowering.

Number of field Inspections:

A minimum of four field inspection shall be made as follows;

1. The first inspection shall be made before flowering preferably within 30 days after planting to determine isolation, volunteer plants, offtypes, planting ratio, planting errors, incidence of downy mildew and other relevant factors

2. The second and third inspection shall be made during flowering to check isolation, pollen shedders, offtypes, downy mildew/green ear (*Sclerospora graminicola*) and other relevant factors.

3. The fourth inspection shall be made at maturity and prior to harvesting and in order to determine the incidence of downy mildew/green ear disease, ergot, grain smut and to verify the true nature of plant and other relevant factors.

Roughing: Roughing should be done frequently to produce high quality seed.

Following precautions should be taken while rouging.

1. Roughing should be started before flowering to avoid contamination with foreign pollen

2. Remove offtypes and volunteer from seed parent and pollen parent by uprooting to prevent regrowth.

3. Female parent rows should be roughed daily during flowering to remove pollen shedders

4. Remove plants in between the lines or male plants in female rows and vice-versa. Remove the plants affected with green ear, ergot and grain smut.

5. Remove offtypes and volunteers from within the isolation distance.

6. Before harvesting rouging should be done based on seed characters.

Harvesting: Harvest the male rows first and keep them separate to avoid mechanical mixture.

Then harvest the female rows and sort out the undesirable heads and reject them before drying and threshing.

Seed Yield: Depending on the potentiality of the inbred line and the management practices adopted the seed yield may be 3-4 Q/ha.