

Crop stages for inspection

The number of field inspections and the stages of crop growth at which the field inspections should be conducted vary from crop to crop. It depends upon duration, and nature of pollination of the seed crop.

If the crop is grown for hybrid seed production, the no. of field inspections during the flowering stage should be more than in the case of self-pollinated / cross/ often cross pollinated varieties.

In hybrid seed production and variety seed production of cross pollinated crops, the inspection during flowering should be made without any prior notice of the seed grower to judge the quality of operation undertaken by him to maintain the genetic purity of the crop. But in the case of self-pollinated crops the seed grower may be informed about the date of inspection.

In the former case if prior notice is given to the seed grower, it may not be possible to detect the damage by the contaminants, whereas in the latter case prior notice will lead to improvement of the quality of the seed production work and thus the quality of seed.

The key points to be observed at each stage of inspection are

Stage of crop	Key points to be observed at Inspection
I. Pre-flowering stage (Vegetative stage)	Verification of seed source
	Confirmation of acreage given in the report
	Land requirement to keep check on genetic as well as physical contamination and spread of disease inoculums.
	Planting ratio
	Border rows
	Isolation distance
II. Flowering Stages: (May be II & III inspections, When 5% of plants begin to flower)	Guide the grower in identification of Off-types, pollen shedder, diseased plants, shedding tassels etc.
	Confirm the observation of plants inspection were correct.
	Confirm whether grower had continued thorough roguing, after the previous inspection.
III. Inspection during post flowering and pre-harvest stage	Verify the removal & occurrence of Off-types, pollen shedders, shedding tassels, objectionable weed plants & diseased plants.
	Confirm the correctness of observations, made in earlier inspections
	Guide the grower on roguing, based on pods, earhead, seed & chaff characters such as colour, shape & size
	Explain to the grower when & how to harvest the crop &



	process
IV. Inspection during harvest (This is the last inspection conducted on a seed crop)	Verify that male parent rows have been harvested separately.
	Ensure complete removal of off-types, other crops, weeds & diseased plants etc.
	Seal properly by the certification agency of the threshed produce after initial leaning & drying.
	Instruct the seed growers for safe storage & transportation.

MINIMUM NUMBER OF FIELD INSPECTIONS REQUIRED FOR DIFFERENT CROPS FOR CERTIFICATION

Crop	Minimum no. of inspection	Stages of crop
Paddy & Wheat	2	Flowering to harvest
Sorghum Hybrid Varieties	4	Ist before flowering, II nd & IIIrd during flowering, IVth prior to harvest.
Maize Inbred lines, Single crosses, Other hybrids	3	Ist before flowering, II nd during flowering and IIIrd prior to harvest
Varieties	4	Ist before flowering Rest during flowering
Varieties	2	I st before flowering IIInd during flowering
Bajra Hybrids	4	Ist before flowering II nd & IIIrd during flowering, IVth prior to or during harvest
Varieties	3	Ist before flowering IIInd during 50% flowering IIIrd prior to harvest
Green gram, Black gram, Red gram Cowpea	2	Ist before flowering II nd at flowering & fruiting stage
Ground nut	2	Flowering to harvest
Sesame (Gingelly)	3	Ist before flowering II nd during flowering IIIrd from fruit maturity to harvest

Sunflower	2	Flowering to harvest
Rape & mustard	3	Ist before flowering II nd from flowering to fruiting IIIrd from fruit maturity to harvest
Soyabean	2	Flowering to harvest
Castor	2	Flowering to harvest
Cotton (Varieties) (Hybrids)	2 4	Flowering to harvest Ist before flowering II nd & IIIrd during flowering IVth during harvest
Brinjal, Tomato Chilli, Bhendi	3	Ist before flowering II nd from lowering to fruiting IIIrd during maturity
Carrot	3	Ist early (20-30 days after sowing), II nd when lifted & re-planted, IIIrd during flowering.
Cabbage	3	Ist before marketable stage II nd when the heads have formed IIIrd during flowering
Cauliflower	4	Ist before marketable stage II nd during curd formation IIIrd when most plants have formed curds IV th during flowering
Onion (seed to seed)	3	Ist during early vegetative stage II nd during bulb formation IIIrd during flowering

Field Counts

The purpose of field inspection is to find out field standards of various factors in the seed farm. It is impossible to examine all the plants in the seed farm. Hence, to assess the field standards of various factors random counting is followed.

The number of counts taken and the method employed in taking counts vary from crop to crop. It is necessary to take a minimum of 5 counts upto 5 acres & an additional count for every 5 acres or part thereof as given below:



Area of the field (in acres)	No. of counts to be taken
Upto 5	5
6-10	6
11-15	7
16-20	8
21-25	9

Double Count

In any inspection, if the first set of counts shows that the seed crop does not confirm to the prescribed standard for any factor, a second set of counts should be taken for that factor. However, when the first set of counts shows a factor more than twice the maximum permitted, it is not necessary to take a second count.

On completion of double count, assess the average for the two counts. It should not exceed the minimum permissible limit.

NO. OF PLANTS FOR A COUNT

S.no.	Crop	No. of plants / heads per count	Remarks
1.	Soyabean, Jute, Lucerne, Mesta, Berseem	1000 plants	Closely planted crops
2.	Beans, Cluster beans, Cowpea, Peas, Green gram, Blackgram, Mustard, Niger, Sesame, Bengal gram, Safflower	500 plants	Medium spaced crops
3.	Bhendi, Brinjal, Chilli, Castor, Cole crops, Cotton, Cucurbits, Maize, Potato, Groundnut, Redgram, Tomato & Sunflower	100 plants	Wide spaced crops
4.	Bajra, Barley, Oats, Paddy, Wheat, Ragi, Sorghum	1000 heads	Tillering crops

Points to be observed before counting

1. All plants falling in each count must be examined for each factor
2. In hybrid seed field, the prescribed number of the field counts should be taken in each parent separately.

Sources of contamination or factors to be observed

The contaminants are



1. Physical contaminants
2. Genetical contaminants.
 1. Physical contaminants are inseparable other crop plants, objectionable weed plants and diseased plants.
 2. Genetical contaminants consist of off-types, pollen shedders and shedding tassels.

a. Off Type

Plant that differs in morphological characters from the rest of the population of a crop variety. Off-type may belong to same spp. or different spp. of a given variety. Plants of a different variety are also included under off-types.

Volunteer plants & mutants are also off-types.

b. Volunteer Plant

Volunteer plants are the plants of the same kind growing naturally from seed that remains in the fields from a previous crop.

c. Pollen Shedders

In hybrid seed production involving male sterility, the plants of 'B' line present in 'A' line are called Pollen shedders.

Sometimes 'A' line tends to exhibit symptoms of fertile anthers in the ear heads of either on the main tiller or side tiller and these are called Partials. These partials are also counted as pollen shedders.

d. Shedding Tassels: These are plants which shed or shedding pollen in female parent rows. When 5 cm or more of the entire spike shed pollen they are also counted as Shedding tassels.

e. Inseparable Crop Plants

These are plants of different crops which have seeds similar to seed crop.

Crop	Inseparable crop plants
Wheat	Barley, oats, gram, & Triticale
Barley	Oats, gram, wheat & Triticale
Oats	Barley, gram, wheat & Triticale
Triticale	Wheat, barley, oats, gram & Rye



f. Objectionable Weed Plants

these are weeds

1. Whose seeds are difficult to be separated once mixed
2. Which are poisonous
3. Which have smothering effect on the main crop
4. Which are difficult to eradicate once established.
5. Difficult to separate the seeds. These seeds cause mechanical admixtures

S.No	Crop	Common name of the weed	Botanical name
1.	Paddy	Wild rice	<i>Oryza sativa var fatua</i>
2.	Wheat	Wild morning glory	<i>Convolvulus arvensis</i>
3.	Sunflower	Wild sunflower	<i>Helianthus spp</i>
4.	Bhendi	Wild okra	<i>Abelmoschus spp</i>
5.	Rape, mustard	Mexican prickly poppy	<i>Argemone mexicana</i>
6.	Lucerne	Dodder	<i>Cuscuta spp</i>

g. Designated Diseases

The diseases which may reduce the yield and quality of seeds are termed as Designated diseases.

S.No	Crop	Name of the Disease	Casual organism
1.	Wheat	Loose smut	<i>Ustilago tritici</i>
2.	Sorghum	Grain smut Head smut	<i>Sphacelotheca sorghii</i>
3.	Pearl millet	Ergot Grain smut Downy mildew	<i>Claviceps microcephala</i> <i>Tolyposporium pencillariae</i> <i>Sclerospora graminicola</i>
4.	Cowpea	Anthraxnose	<i>Colletotrichum lindemuthianum</i>
5.	Green gram	Halo blight	<i>Pseudomonas phasiolicola</i>
6.	Gingelly	Leafspot	<i>Cercospora sesami</i>
7.	Sunflower	Downy mildew	<i>Plasmopara halstedii</i>
8.	Brinjal	Phomopsis blight	<i>Phomopsis vexans</i>
9.	Chilli	Leaf blight Anthraxnose	<i>Alternaria solani</i> <i>Colletotrichum capsici</i>
10.	Tomato	Early blight Leaf spot Tobacco mosaic virus (TMV)	<i>Alternaria solani</i> <i>Stemphylium solani</i>

Land Requirement

The field offered for certified seed production should not been grown in the previous season with the same crop. If it was grown, the variety should be the same. In that case, the field should be irrigated at least 3 weeks before sowing and ploughed just prior to sowing, in order to destroy germinating seeds.

Isolation

Separation of seed fields from fields of other varieties of the same crop, same variety fields not conforming to varietal purity requirements, and other related species fields and fields affected by diseases to prevent genetic & disease contamination.

The minimum distance to be maintained between the seed crop and the contaminant is called Isolation distance.

Crop	F.S (m)	C.S (m)
Self pollinated crops		
Cereals and Millets		
Paddy	3	3
Wheat	3	3
Pulses		
Green gram	10	5
Black gram	10	5
Soya bean	3	3
Bengal gram	10	5
Cowpea	10	5
Lab lab	10	5
Oil Seeds		
Groundnut	3	3
Vegetables		
Tomato	50	25
Cluster beans	10	5
French beans	10	5
Peas	10	5
lettuce	50	25
Potato	5	5
Often Cross Pollinated crops		
Millet		
Sorghum Variety	200	100
Sorghum hybrid	300	200



Pulses		
Red gram	200	100
Oil Seeds		
Sesame	100	50
Cotton (variety)	50	30
Vegetables		
Brinjal	200	100
Chillies	400	200
Bhendi	400	200
Cross Pollinated Crops		
Millets		
Maize (varieties)	400	200
Inbred line	400	-
Single cross hybrid	400	-
Double cross hybrid	-	200
Bajra variety	400	200
Bajra hybrid	1000	200
Sun hemp	200	1000
Castor	300	150
Sunflower variety	400	200
Sunflower hybrid	600	400
Cabbage	1600	1000
Beetroot	1600	1000
Radish	1600	1000
Cauliflower	1000	500
Onion	1000	800
Carrot	400	200
Amaranthus	1000	500
Gourds		

Inspection Report

The seed certification officer after taking field counts and comparing them with the minimum field standards, the observations made on the seed farm field should be reported in the prescribed proforma to



1. Deputy Director of S.C
2. To the Seed producer
3. AD, S.C
4. Retained with him.

Assessment of seed crop yield

It is necessary to avoid malpractices at the final stage during harvest operation. The seed certification officer is expected to fix the approximate seed yield.

L.F.R REPORT (Liable For Rejection Report)

If the seed crop fails to meet with any one factor as per the standards, L.F.R report is prepared & the signature of the producer is obtained & sent to D.DSC within 24 hrs.

RE-Inspection

For the factors which can be removed without hampering the seed quality, the producer can apply for re-inspection to the concerned D.D,S.C within 7 days from the date of F.I rejection order. For re-inspection half of the inspection charge is collected.

4. Post Harvest Supervision Of Seed Crop

The post harvest inspection of a seed crop covers the operations carried out at the threshing floor, transport of the raw seed produce to the processing plant, pre-cleaning, drying, cleaning, grading, seed treatment, bagging & post processing storage of the seed lot.

Pre-requisites for processing

1. Processing report should accompany the seed lot
2. ODV test for paddy should be done at the time of sealing & issue of processing report or before processing. If the result exceeds 1% the produce may be rejected.
3. It should correlate with the estimated yield.
4. Seed should be processed only in approved processing unit.
5. Field run seed should be brought to the processing unit within 3 months from the date of final inspection. Processing & sampling should be done within 2 months in oil seed crops & 4 months for other crops from the date of receipt in the processing unit. In cotton, the kapas from the passed lot should be moved to the ginning factory within 5 days from the date of issue of processing report. The ginning should be done within 3 months from the date of final harvest inspection report. Ginned seeds should be moved to seed processing unit within 5 days of ginning. Inspection and sampling should be done within 3 months after ginning.

Intake of Raw Produce & Lot Identification



The seed certification officer in-charge of the seed processing plant may, after verification of the above stated documents and total amount of seed accept the produce for processing. After verification he should issue a receipt to the seed grower. Each seed lot has to be allocated a separate lot number for identification.

Processing of seed lot

1. It is done to remove chaff, stones, stem pieces, leaf parts, soil particles etc from the raw seed lot.
2. Grading to bring out uniformity in the seed lot.
3. Seed treatment to protect it from storage pests & diseases.

Processing Inspection

1. The processing should be done in the presence of concerned seed certification officer.
2. The recommended sieve size should be used for grading.
3. While processing of paddy, the work of perfect processing has to be evaluated then & there. This is done by conducting a **float test**. Take 400 seeds from the processed seed & put into a tumbler of water. Count the floating paddy seeds. Maximum float admissible is 5%. If the float seeds exceed the limit, adjust the air flow or feeding to perfect the processing.
4. In maize, before shelling, the cobs should be examined for off-type and off-coloured kernels. Individual cobs should be examined with reference to its Varietal characters. The cobs of off-types and off-coloured kernels should be rejected.
5. Seed Sorting in Cotton.

The ginned seeds will be evaluated for its quality. A maximum of 3% for the following factors can be taken into account.

- Immature seeds
- Ill-filled seeds
- Broken seeds
- Stained seeds &
- Over fuzzy seeds.

Groundnut Pod Verification

- In groundnut 4% of ill-filled pods can be allowed.
- After processing, the seeds may be treated, packed, weighed & sealed before the SCO.