

**NATIONAL SEED INDUSTRY COUNCIL**  
**Vegetable Crops Technical Working Group**

**POLICIES AND GUIDELINES FOR TESTING**  
**VEGETABLE CROP VARIETIES**

**A. Importance**

Development and /or introduction of new vegetable varieties with greater productive potentials, better resistance to insect pests and diseases and with good eating and/or processing qualities are necessary components in the development of the vegetable industry. To determine which of the new promising varieties have the desirable characteristics, they should be tested under wide range of agro-climatic conditions.

A national cooperative testing (NCT) is necessary so that only variety/ies with the desired important characteristics is/are recommended to the National Seed Industry Council (NSIC) for accreditation and registration as commercial variety/ies.

**B. Objectives**

The aims of the program are to test the performance of potential varieties, hybrids/stable breeding lines and open-pollinated varieties (OPVs) of different vegetable crops developed by breeding institutions to different agro-climatic conditions; and to recommend to the NSIC the outstanding selection for release as commercial variety/ies.

**C. Participating Agencies**

The NCT shall be conducted jointly by Institute of Plant Breeding-Crop Science Cluster (IPB-CSC,UPLB), Department of Agriculture- Regional Field Unit (DA-RFU's), Bureau of Plant Industry (BPI), Philippines Council for Agriculture and Aquatic and Natural Resources Research and Development (PCAARRD) and selected member institutions such as state colleges and universities (SCU's). Private institutions directly involved in vegetable varietal improvement work shall also be considered.

**D. Organization and Functions**

The regular members of the Vegetable Crops Technical Working Group (VCTWG) shall not be less than five (5) but not more than fifteen (15) (Article 11, Sec. 6) to be headed by Chairman and Vice Chairman/Coordinator. Regular member is selected by the VCTWG and recommended to the Executive Director of the National Seed Industry Council.

Associate Member is selected by the VCTWG and recommended to the Chair of the Technical Working Group. The member is the study leader conducting the NCT identified as the testing sites.

The tenure is fixed at two years and maybe renewed upon the recommendation of the Chair of the VCTWG. Renewal of tenure is limited to two times only. The Chair shall be elected by the members and may be re-elected only once.

Research personnel with varied specialization (Plant Breeding, Horticulture, Plant Pathology, Entomology, Post harvest Technology) of any public and private institutions directly involved in vegetable improvement and seed industry can be a member of the VCTWG with the recommendation of the head of the institution concerned and with the approval of the Executive Director of NSIC.

The group shall be responsible in conducting the national, regional and provincial test and evaluate the promising varieties before it is recommended to the Council.

#### **E. Schedule of Meeting**

The Chair will convene for a minimum of one regular meeting a year at a venue decided upon by the members of the VCTWG. The members may also act by referendum on matters that are not acted upon during the regular meetings.

#### **F. Budget Requirement of the VCTWG**

The NSIC shall allocate funds for the Technical Working Group to support the maintenance and operating expenses of approved activities implemented by the working groups. Traveling expenses of the members are charged to the NSIC during the TWG meetings.

### **G. RULES AND REGULATIONS FOR FIELD TESTING OF VEGETABLE CROP VARIETIES**

#### **I. Entries for Testing**

1. Government and/or private institutions contributing entries for national and regional evaluations are required to provide the following:
  - a. 30 grams of tomato/eggplant seeds, 300 grams of squash and 2.0 kg of pole sitao per entry good for 1 season for at least 6 testing sites and the subsequent seed supply for 3 more seasons
  - b. Information form:
    - Name/address of breeder/institution or company
    - Yield range
    - Maturity
    - Pest/disease reactions
    - Eating/processing qualities
2. Entries should be promising in yield with degree of resistance to major insect pests and diseases. Yield must equal or outperform the standard check variety.

## II. Test Locations

1. Evaluation shall be conducted in the following locations:

Locations	Crops to be tested
1. Cagayan Valley Integrated Agricultural Research Center (CVIARC), Ilagan, Isabela	tomato, eggplant, squash, pole sitao
2. Bicol Integrated Agricultural Research Center (BIARC), Pili, Camarines Sur	tomato, eggplant, pole sitao
3. BPI-Los Baños National Crop Research and Development Center, Los Baños, Laguna	tomato, eggplant, squash, pole sitao
4. Visayas State University (formerly Leyte State University), Baybay, Leyte	tomato, eggplant, squash, pole sitao
5. Northern Mindanao Integrated Agricultural Research Center (NOMIARC), Bukidnon	Tomato, eggplant, squash
6. Benguet State Univeristy La Trinidad, Benguet	Tomato
7. Central Luzon State University (CLSU), Muñoz, Nueva Ecija	tomato, eggplant, squash, pole sitao
8. Mariano Marcos State University (MMSU), Batac, Ilocos Norte	tomato, eggplant, squash, pole sitao
9. DA-Central Mindanao Integrated Agricultural Research Center (CEMIARC), Tupi, South Cotabato	tomato, eggplant, squash, pole sitao
10. University of Southern Mindanao	tomato, eggplant, squash, pole sitao

2. For regional trials, other public and/or private institutions may conduct the trials in the locations of their choice, preferably in the production areas of the crop and at cost of the concerned institutions.

## III. Number of entries

5-12 entries including check varieties. The check varieties should be the latest NSIC-released and commercial varieties.

## IV. Number of Testing

The entries shall be evaluated on station for a minimum of 4 growing seasons (2 wet and 2dry) in at least 6 locations for national recommendation. For regional recommendation, the entries shall be evaluated for a minimum of 2 growing seasons in at least 3 locations.

## V. Dropping of entries

Any entry may be dropped from further testing based on yield, susceptibility to pest and diseases and poor horticultural characters. As a general rule, entries with significantly lower yield than the check for 2 consecutive growing seasons in at least 75% of the location shall be discarded and be replaced by new entries for evaluation. The rest of the entries shall be retained until the number of trials have been completed.

## VI. Calendar of activities

<b>Activity</b>	<b>Wet Season</b>	<b>Dry Season</b>
Submission of entries/meetings	April – May	September – October
Planting	May – June	November – December
Submission of Data (analyzed data)	October - November	April – May

### a. Monitoring/Evaluation Team:

The on-station trials shall be monitored/evaluated by a monitoring group by region. The group will be composed of the Chairman of the VCTWG, regional representative and breeders of entries under evaluation. Monitoring shall be done for two seasons (1 wet and 1 dry).

Source of fund of the monitoring team shall be shouldered by the NSIC.

## VII. Recommendation for the National Seed Industry Council

The VCTWG shall recommend to the NSIC the potential entry/ies to be released as commercial variety/ies for national and regional recommendations.

The basis for recommendation will be as follows:

- a. For tomato and squash, marketable yield must be equal or higher by 5% over the check for wet season and 10% higher than the check for dry season
- b. For eggplant, marketable yield must be 10% higher than the check in both seasons
- c. For pole sitao, marketable yield must be equal or 5% higher over the check in both seasons
- d. For other vegetable crops, marketable yield must be equal or higher by 5% over the check for both seasons,

If marketable yield of the potential entry is equal to the check, the entry should possess distinctive traits or qualities better than the check.

The recommendation of any given variety/hybrid shall be accompanied by information about its fruit yield per hectare and per plant (weight and number), number of days from emergence to maturity, reaction to pests and diseases as observed under field conditions, eating and post harvest quality. Likewise, any available data on other horticultural characteristics shall accompany the recommendation.

Recommendation will be based on the results of at least six (6) locations for national recommendation and at least three (3) locations for regional recommendation. Data to be considered must have allowable coefficient of variation (C.V.) of 25% for the dry season and 30% for wet seasons, respectively. Only yield data with significant differences will be included in the final evaluation.

## GUIDELINES IN NCT OF POLE SITAO

TIMETABLE	ACTIVITIES/OPERATION
<p><b>A. Days Before Planting (DBP)</b></p> <p>30-15</p> <p>0</p>	<p><b>Land Preparation</b></p> <ul style="list-style-type: none"> <li>• Prepare soil by alternate plowing and harrowing for two times.</li> <li>• Prepare row 0.75 m apart and 5 m long. The trial shall be laid out in RCBD with four replications. For each entry per replication, a 5 m two-row plot shall be used. The plants will be spaced at 30 cm. between hills with 2 plants/hill. Border plants shall be planted in both ends of the block.</li> </ul> <p><b>Planting</b></p> <ul style="list-style-type: none"> <li>• Plant 3 seeds/hill</li> <li>• Apply basal fertilizer at the rate of 36 grams 14-14-14 per plot</li> </ul>
<p><b>B. Days After Planting (DAP)</b></p> <p>10</p> <p>21</p> <p>22-25</p> <p>30-35</p> <p>40-45</p>	<ul style="list-style-type: none"> <li>• Thin out seedlings to 2 plants/hill</li> <li>• Irrigate if necessary</li> <li>• Hilling up</li> <li>• Trellising</li> </ul> <p><b>Fertilization</b></p> <ul style="list-style-type: none"> <li>• Sidedress 15 grams urea + 15 grams Muriate of potash/plot after flowering</li> <li>• For pest and disease control, use a combination of organic (botanical) and inorganic materials.</li> </ul> <p><b>Harvesting</b></p> <ul style="list-style-type: none"> <li>• Start harvesting of pods 3x a week</li> </ul>

Data to be gathered:

1. Days to emergence
2. Days to 50% flowering from emergence
3. Days from emergence to first harvest
4. Days from emergence to last harvest
5. Plant height (cm) at first harvest
6. Plant height (cm) at last harvest
7. Plot yield in kg ( marketable and non-marketable of fresh pods)
- 8 Yield in t/ha (marketable and non-marketable fresh pods )

9. Shelf life (days) – Weight of ½ kg fresh pod until 50% weight loss and visual appearance. Taken at 3<sup>rd</sup> harvest
10. Pod length (cm)
11. Reaction to Insect pest using 1-5 Rating Scale against pod borer, aphids, mites, thrips, whitefly etc)\*
12. Reaction to Diseases using a 1-5 Rating Scale (against Rust, mosaic virus, fusarium wilt)\*

\* Rating Scale for resistance to insect pests and diseases:

1 – No disease infection/infestation (0%)	- R
2 – Mild infection/infestation (1–25%)	- MR
3 – Moderate infection/infestation (26-50%)	-Intermediate
4 – Severe infection/infestation (51-75%)	- MS
5 – Very severe infection/infestation (76-100%)	- S

## GUIDELINES IN NCT OF EGGPLANT

<u>TIMETABLE</u>	<u>ACITIVITES/OPERATION</u>
<b>A. Days Before Transplanting (DBT)</b>	<b>1. Starting Seedlings</b>
35	<ul style="list-style-type: none"> <li>• Prepare soil mixture: burned rice hull, compost and ordinary soil at 1:1:1 ratio</li> <li>• Sterilize soil mixture by baking or steaming</li> <li>• Place sterilized soil mixture in peat pots/paper pot or other similar containers; arrange in seedling tray</li> <li>• Sow 2-3 seeds per peat pot or paper pots</li> <li>• Water the seedlings at almost saturated condition for 3 successive days.</li> <li>• Thin the seedlings into one seedling per potlet</li> <li>• Spray fungicide/insecticide when necessary.</li> <li>• Apply starter solution (10 grams of urea/gallon of water) 15 days from germination: dissolve in water.</li> <li>• Harden seedlings 15-20 days from germination by reducing the frequency of watering</li> <li>• Allow seedlings to exhibit temporary wilting</li> <li>• Water the seedlings at almost saturated condition before transplanting</li> </ul>
34	
33-30	
25-20	
7	
6-5	
0	
<b>B. Days After Transplanting (DAT)</b>	<b>2. Land Preparation</b>
5-6	<ul style="list-style-type: none"> <li>• Apply lime (CaCO<sub>3</sub>) at a rate of 5-7 tons/ha for soil with 4.5 - 5.0 pH.</li> <li>• Prepare rows 1.0 m apart with the ridges 20-30 cm in height. The trial shall be laid out in RCBD with four replications. For each entry per replication, a 5 m two-row plot shall be used. The plants will be spaced at 75 cm between hills (6 plants/row). Border shall be planted in both ends of the block.</li> <li>• Apply at least 200gms of decomposed chicken dung/compost or any organic fertilizer per hill.</li> <li>• Mulch the beds with any available mulching material at 0.75 m between hill.</li> </ul>
7-8	
	<b>3. Planting</b>
	<ul style="list-style-type: none"> <li>• Apply complete fertilizer at the rate of 10 g/hill</li> </ul>
	<ul style="list-style-type: none"> <li>• Transplant seedlings</li> <li>• Irrigate just after transplanting</li> <li>• Replant weak and abnormal seedlings</li> <li>• Irrigate /water the plants whenever necessary.</li> <li>• For pest and disease control, use a combination of</li> </ul>



	organic (botanical) and inorganic materials. If insecticides shall be used, select the green label
14-21	<p><b>4. Fertilization</b></p> <ul style="list-style-type: none"> <li>1<sup>st</sup> sidedressing of fertilizer: Prepare a mixture of 107 g 14-14-14, 125g of solophos 0-20-0, 100g of 45-0-0. Apply the mixture at a rate of 21 g/hill)</li> <li>2<sup>nd</sup> sidedressing of fertilizer: apply 10-15 g/hill of a 1:1 mixture of urea and 0-0-60</li> <li>3<sup>rd</sup> sidedressing of fertilizer: apply of 10-15 g/hill of 1:2 mixture of urea and 0-0-60</li> </ul>
30	
42	
80-85	<p><b>5. Harvesting</b></p> <ul style="list-style-type: none"> <li>Start harvesting of harvestable fruits at a frequency of twice a week</li> </ul>

**Data to be gathered:**

- Days to 50% flowering from transplanting
- Days from transplanting to first harvest
- Days from transplanting to last harvest
- Plant height (cm) at first harvest and last harvest
- Number of fruits per kilogram at 3<sup>rd</sup> harvest
- Number of marketable, non marketable fruits per plot
- Plot yield in kg (marketable/non marketable and total)
- Yield per hectare in tons (marketable/non marketable and total))
- Number of hills harvested per plot
- Length and diameter (cm)<sup>a</sup> of 10 sample fruits
- Calyx color
- Straightness rating (5-straight to 1-crooked)
- Shelf life (days)<sup>b</sup>
- Reaction to insect pest using a 1-5 rating scale<sup>c</sup> against fruit borer, leafhopper, thrips, etc
- Reaction to diseases such as bacterial wilt, phomopsis, etc using a 1-5 rating scale<sup>c</sup>

Allowable C.V.(%): 25 (DS); 30 (WS)  
Treatment Mean Separation is by DMRT

<sup>a</sup> Taken at 3<sup>rd</sup> harvest from 10 fruit samples per entry per replication

<sup>b</sup> Shelf life is taken by weighing 1 kg mature fruits/entry/replication at 2 day interval after harvest until 50% deterioration

**<sup>c</sup>Rating scale for resistance to insect pest and disease:**

- Highly Resistant (none of the plant population was infected/infested)
- Moderately resistant (1 - 25% of the plot population was infected/infested)
- Intermediate (26 – 50% of the total plant population was infected/infested)
- susceptible (51 – 75% of the total plant population/plot was infected/infested)
- Very susceptible (76-100% of the total plant population was infected/infested)

## GUIDELINES IN NCT OF SQUASH

TIMETABLE	ACITIVITES/OPERATION
<b>A. Days Before Planting (DBT)</b>	<b>1. Land Preparation</b>
30-15 15	<ul style="list-style-type: none"> <li>• Plow and harrow the field twice</li> <li>• Furrow field at 1.0 meter apart</li> <li>• Prepare two (2) rows per plot, three (3) meters wide and 5 meters long</li> <li>• Space between double rows is 2.0 meters.</li> <li>• Experiment will be laid out in RCBD with four replications</li> </ul>
14	<ul style="list-style-type: none"> <li>• Incorporate decomposed chicken manure at 1 kg per hill</li> </ul>
13-12	<ul style="list-style-type: none"> <li>• Mulch the beds to be planted using black mulching sheet</li> </ul>
10	<ul style="list-style-type: none"> <li>• Make holes spaced at 1.0 meter (there will be a total of 10 hills per plot)</li> <li>• For wet season cropping, add 1.0 meter for drainage between replications</li> </ul>
15	<p><b>2. Seedling Establishment</b></p> <ul style="list-style-type: none"> <li>• Sow the seeds in plastic trays</li> </ul>
0	<p><b>3. Transplanting</b></p> <ul style="list-style-type: none"> <li>• Transplant 2 healthy seedlings/hill</li> <li>• Replant missing hills or weak plants</li> </ul>
7	
<b>B. Days After Planting (DAP)</b>	
21	<p><b>4. Training the vines</b></p> <p>Spread the vines so that they are evenly distributed over the area</p>
30	<p><b>5. Fertilization</b></p> <ul style="list-style-type: none"> <li>• First sidedressing of 10-15 g Urea per hill</li> </ul>
45	<ul style="list-style-type: none"> <li>• Second sidedressing of 10-15 g mixture of 1:1 Urea and 0-0-60 per hill</li> </ul>
60	<ul style="list-style-type: none"> <li>• Third sidedressing of 10-15 g mixture of 1:2 Urea and 0-0-60 per hill every 15 days if necessary</li> </ul>
	<p><b>6. Irrigation</b></p> <ul style="list-style-type: none"> <li>• Irrigate every other day for the first 3 weeks after planting and once a week thereafter</li> <li>• For wet season, irrigate as needed.</li> </ul>
70-75 DAP	<p><b>7. Harvesting</b></p> <ul style="list-style-type: none"> <li>• The following are the fruit maturity indices for squash: <ul style="list-style-type: none"> <li>a. The days from anthesis or pollination to maturity</li> </ul> </li> </ul>

	<p>is usually 30-40 days</p> <ol style="list-style-type: none"> <li>b. Appearance of powder/whitish substance on the surface of the fruit skin</li> <li>c. Rind becomes hard</li> <li>d. Actual sampling wherein seeds are fully developed</li> </ol>
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**Data to be gathered:**

1. Days from transplanting to 50% flowering (50% of the experimental plants per plot had flowers)
2. Days from transplanting to first harvest
3. Days from transplanting to last harvest
4. Resistance to disease (bacterial wilt, viruses, downy mildew, etc)<sup>1</sup>
5. Resistance to insect pest (squash beetle, etc)<sup>1</sup>
6. Plot yield in kg per 15 m<sup>2</sup> (marketable/non -marketable) and total
7. Yield in t/ha (marketable/non-marketable) and total
8. Average fruit weight (weigh 5 random sample fruits per plot)
9. Flesh Color<sup>2</sup>
10. Sensory test/general acceptability
11. Chemical test ; sugar, starch, dry matter content
12. 100 seed weight (dry 14% MC)
13. Flesh thickness (cm)
14. Fruit Shape
15. Fruit length and diameter (cm)
16. Reaction to Insect pest using a 1-5 rating scale against fruit worm, leaf miner, beetles
17. Reaction to Disease using a 1-5 rating scale against bacterial wilt, virus, blight)

Treatment Mean Separation is by DMRT

<sup>1</sup> Rating scale for insect pest and disease resistance:

- 1 – Highly resistant (none of the plant population/plot was infected/infested)
- 2 – Moderately resistant (1 - 21% of the plant population was infected/infested)
- 3 – Intermediate (26 – 50% of the total plant population was infected/infested)
- 4 – Susceptible (51 – 75% of the total plant population was infected/infested)
- 5 – Very susceptible (76-100% of the total plant population was infected/infested)

<sup>2</sup> Average of 5 fruits per replicate:

- 1 – light yellow
- 5 – dark orange

## GUIDELINES IN NCT OF TOMATO

TIMETABLE	ACITIVITES/OPERATION
<b>A. Days Before Transplanting (DBT)</b>	<b>1. Starting Seedlings</b>
35	<ul style="list-style-type: none"> <li>• Prepare soil mixture: burned rice hull, compost and ordinary soil at 1:1:1 ratio</li> <li>• Sterilize soil mixture baking, steam or chemical</li> <li>• Place sterilized soil mixture in peat pots/paper pot or other similar containers; arrange in seed pots, plastic trays or Styrofoam container.</li> </ul>
34	<ul style="list-style-type: none"> <li>• Sow 2-3 seeds per peat plots or paper pots</li> <li>• Water seedlings at almost saturated condition for 3 successive days.</li> <li>• Regulate watering to control the rate of growth and development of seedlings</li> </ul>
33-30	<ul style="list-style-type: none"> <li>• Spray fungicide/insecticide when necessary.</li> <li>• Apply starter solution (14-14-14 at 1 tbsp/gal. of water</li> <li>• Harden seedlings 15-20 days from germination by reducing the frequency of watering</li> <li>• Allow seedlings to exhibit temporary wilting</li> <li>• Water the seedlings at almost saturated condition before transplanting</li> </ul>
25-20	<p><b>2. Land Preparation and Transplanting</b></p> <ul style="list-style-type: none"> <li>• Apply lime (<math>\text{CaCO}_3</math>) 5-7 tons/ha for soil pH 4.5 - 5.0</li> <li>• Prepare soil by alternate plowing and harrowing for two times followed by rotavation</li> <li>• Prepare beds 30 cm. in height and 1.2 m in width.</li> <li>• The trial shall be laid out in a RCBD with four replications. For each entry per replication, a 5 m two-row plot shall be used. Border plants shall be planted in both ends of the block</li> </ul>
7	<ul style="list-style-type: none"> <li>• Apply at least 200 g/hill of decomposed chicken dung or any organic fertilizer.</li> </ul>
6-5	<ul style="list-style-type: none"> <li>• Mulch the beds with polyethylene plastic and put holes space at 0.4 m between hills and 1.0 m between rows (optional, whenever necessary).</li> </ul>
0	<ul style="list-style-type: none"> <li>• Apply fertilizers at the rate of 10 g/hill before transplanting. However, the rate of fertilizer application can be modified depending on the result of soil analysis</li> <li>• Transplant one seedling per hill and irrigate just after transplanting</li> </ul>

<b>B. Days After Transplanting (DAT)</b>	
5-6	<ul style="list-style-type: none"> <li>• Rogue weak and abnormal seedlings and replant with healthy ones</li> <li>• Weekly irrigation/watering</li> </ul>
14	<ul style="list-style-type: none"> <li>• For pest and disease control, use a combination of organic (botanical) and inorganic materials. If insecticides shall be used, select the green label</li> <li>• 1<sup>st</sup> sidedressing of 10 g mixture of 1:1 urea and muriate of potash per hill at a rate of 10 gms/hill</li> <li>• Provide trellis to indeterminate varieties</li> <li>• 2<sup>nd</sup> sidedressing of 10 g of mixture of 1:1 urea and muriate of potash per hill at a rate of 10 gms/hill</li> <li>• 3<sup>rd</sup> sidedressing of 10 g of mixture of 1:1 urea and muriate of potash per hill or as needed depending on plant vigor</li> </ul>
55-60	<ul style="list-style-type: none"> <li>• Start harvesting harvestable fruits twice a week</li> </ul>

**Data to be gathered:**

1. Days from transplanting to 50% flowering
2. Days from transplanting to first harvest
3. Days from transplanting to last harvest
4. Plant height (cm) at first harvest and last harvest
5. Number of fruits per kilogram at 2nd harvest
6. Plot yield in kg / 10 m<sup>2</sup> (marketable, non marketable and total)
7. Hectare yield in t/ha (marketable, non marketable and total)
8. Number of marketable fruits per plot
9. Number of hills harvested per plot/harvest
10. Fruit polar length and equatorial diameter (cm)<sup>a</sup>
11. Cracking behavior (RD- radial; C- concentric)
12. Fruit shape (use/see the attached figure/picture)
13. Shelf life (days)
14. Reaction to Insect pest using a 1-5 rating scale against fruit worm, leaf miner, beetles
15. Reaction to Disease using a 1-5 rating scale against bacterial wilt, virus, blight)
16. Physiological disorders (blossom end rot (blotching))

Allowable C.V.(%): -25 (DS); 30 (WS); Treatment Mean Separation is by DMRT

<sup>a</sup> Taken at 2<sup>nd</sup> harvest from 10 fruit samples per entry per replication

Shelf life is taken by weighing 10 green mature fruits/entry/replication until 50% deterioration (shriveled, rotting)

Fruit Shape : G – Globe; SG – semi globe; DG – deep globe; DO – deep oblate; P – plum (use descriptor)

**Rating Scale for resistance to Insect pest and Disease:**

- 1 – Highly Resistant (none of the plant population/plot was infected/infested)
- 2 – Moderately resistant (1 - 21% of the plant population /plot was infected/infested)
- 3 – Intermediate (26 – 50% of the total plant population/plot was infected/infested)
- 4 – Susceptible (51 –75% of the total plant population/plot was infected/infested)
- 5 – Very Susceptible (76-100% of the total plant population/plot was infected/infested)