Procedures for Sweet Pepper Field Evaluation Trials

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Introduction

These suggestions are intended for researchers evaluating the International Sweet Pepper Nursery (ISPN) trials, coordinated by AVRDC. (Other researchers interested in testing chili peppers under their local conditions might also find the procedures useful.) In order that data recorded at different locations can be compared, it is essential that data collection be done uniformly. These instructions were developed to provide uniform procedures. For more information on seedling and crop production, see the AVRDC Cooperators' Guide *Suggested Cultural Practices for Sweet Pepper*.

Choice of land

Select an area which is well drained and has fairly uniform fertility and slope.

Experimental design

A randomized complete block design with four replications is suggested (Figs. 1, 2).

Number of entries

In addition to the five entries included in the ISPN, it is expected that one local variety will be added at each location for comparison. Each seed envelope contains approximately 160 seeds, more than enough for an initial two-row plot trial (20 plants/plot) with four replications.

Plot specifications

Each plot should be established on a raised bed 1 m wide and 5 m long, with two rows of plants 50 cm apart. Plant spacing within rows should be 50 cm. The suggested distance between furrows is 1.5 m, thus giving a plot size of 1.5 x 5 m (7.5 m²).

Seedling establishment

Ideally, seedlings should be raised in seedling trays using a sterile sowing medium so that healthy, vigorous seedlings are produced. If seedlings are started in a soilbed, the soilbed should be sterilized by burning a layer of rice straw or other organic matter on top of it before sowing. Seedlings should be raised in a greenhouse or screenhouse, or protected with nylon netting to keep out aphids and whiteflies, so that plants are not infected with viruses prior to transplanting.

Transplanting

Under favorable environmental conditions, plants will reach the five-leaf stage about four to five weeks after sowing. This is the time to transplant. Plant border rows of a local variety around the trial (Fig. 1).

Cultural practices

For recommended cultural and management practices after transplanting, see S*uggested Cultural Practices for Sweet Pepper*.

Harvesting

Fruits should be picked when they reach the green mature stage, just before mature color begins to develop. At this stage fruits often make a 'popping' sound when gently squeezed. Under optimum conditions it takes about 40–45 days after flowering for the first fruits to reach the green mature stage. Sweet pepper production can continue for several months under optimum conditions, but we recommend that yield data be recorded for only the first three or four harvests. Harvests should be performed every 7–10 days as fruits mature. Copies of the data sheets should be made for use at each harvest.

Fig. 1. Sample field layout for one replication

Border	1	2	3	4	5	6	Border
XX	ZZ*	ZZ*	ZZ*	ZZ*	ZZ*	ZZ*	XX
XX	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX
XX	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX
XX	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX
XX	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX
XX	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX
XX	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX
XX	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX
XX	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX
XX	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX
XX	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX
XX	ZZ*	ZZ*	ZZ*	ZZ*	ZZ*	ZZ*	XX

X = border plant variety; Z Z* = border plants that will not be harvested; Z = a plant of the entry assigned to that plot. Vertical lines represent furrows between the plots. Plots should be laid out in order within each rep (1–6, 7–12, 13–18, 19–24) as shown on the accompanying data sheets.

Fig. 2. Plot randomization for four replications of a randomized complete block design

Plot for Rep 1	1	2	3	4	5	6
Plot for Rep 2	7	11	9	12	10	8
Plot for Rep 3	14	17	16	13	15	18
Plot for Rep 4	22	19	24	20	21	23

Data to be gathered

Record location-specific (latitude, elevation, soil type, etc.), experiment-specific (soil texture, plot size, etc.), and phenotypic data (fruit yield, days to 50% anthesis, etc.) on the accompanying data sheets. Phenotypic data should be recorded on a plot basis (border plants around the trial should NOT be included in data collection) The four most important traits to measure are days to 50% anthesis, days to 50% maturity, fresh biomass, and fresh ripe fruit yield.

1 **Days to 50% anthesis:** *Number of days after transplanting (DAT) to 50% anthesis (50% of the plants in a plot have open flowers at the second node). Check plots three times per week.*

2 **Days to 50% maturity:** *Number of days after transplanting (DAT) to 50% maturity (50% of the plants in a plot have green mature fruits ready to harvest). Check plots three times per week.*

3 **Fresh biomass:** *After the last harvest, randomly choose five plants per plot and cut them off at the ground. Remove all fruits and record fresh weight of the plants.*

4 **Fresh fruit yield:** *Total marketable yield of fresh green fruits harvested from each plot (total of three harvests. Record the harvest dates.*

5 **Fruit weight:** *Average weight (grams) of 10 fruits from the second harvest.*

6 **Fruit length:** *Average length (cm) of 10 fruits from the second harvest.*

7 **Fruit width:** *Average width (cm) of 10 fruits from the second harvest.*

8 **Biotic stress:** *Record observations on disease(s) and insect(s) present in the plots when damage occurs. Record symptoms as "none", "mild", or "severe".*

9 **Remarks:** *Any other interesting observations not recorded elsewhere.*

Data sheet for recording location and experiment data

1. Location data

    A. Location name and latitude

       Altitude of field

    B. Soil texture and pH

    C. Previous crop

    D. Environment during growing season (hot–wet, hot–dry, cool–dry, or cool–wet)

2. Experiment data

    A. Sowing date

    B. Transplanting date

    C. Harvest dates   1st: 2nd: 3rd: 4th:

    D. Seedling management system (bare root, seedling tray, etc.)

    E. Number of plants/plot

    F. Number of rows/plot

    G. Distance between rows

    H. Distance between plants within rows

    I. Plant population density (plants/ha)*

    J. Plot dimensions

    K. Herbicide(s) used, and when applied

    L. Insecticide(s) used, and when applied

    M. Fungicide(s) used, and when applied

    N. Special management practices used, if any

In your opinion, considering yield, plant type, fruit acceptability to local consumers, and other factors, which are the four best sweet pepper lines?

    1_____

    2_____

    3_____

    4_____

* To determine plant population density, calculate number of plants in one square meter and multiply by 10,000. For example, for a 1.5 m x 5 m (7.5 m^2) plot with 20 plants, divide 20 by 7.5 (= 2.667 plants/m^2) and multiply by 10,000 (= 26,670 plants/ha)

Data sheet for recording total yield and other pheontypic traits for Reps 1 and 2

Location: Harvest dates: 1st: 2nd: 3rd: 4th:

Plot	Rep	Entry	Days to 50% anthesis (DAT)	Days to 50% maturity (DAT)	Fresh biomass (5 plants) (g)	Total fruit yield (kg)	Average fruit weight (g)	Average fruit length (cm)	Average fruit width (cm)	Biotic stress notes	Remarks
1	1	1									
2	1	2									
3	1	3									
4	1	4									
5	1	5									
6	1	6									
7	2	1									
8	2	6									
9	2	3									
10	2	5									
11	2	2									
12	2	4									
13	3	4									
14	3	1									
15	3	5									
16	3	3									
17	3	2									
18	3	6									
19	4	6									
20	4	5									
21	4	2									
22	4	1									
23	4	4									
24	4	3									

DAT = days after transplanting