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SURVEY ON MAJOR DISEASES OF VEGETABLE AND FRUIT CROPS IN CHITTAGONG REGION

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Abstract

A survey was conducted during October 2006 to June 2008 to observe disease prevalence of vegetable and fruit crops in Chittagong region. Through the survey, 24 diseases with their incidence and severity were recorded. The average higher leaf infection in early blight of potato and fruit infection in soft rot of potato were recorded 37% and 39%, respectively. The highest leaf infection (43%) of early blight of tomato that was more frequented (mode) 36% in different locations with $\pm 0.45\%$ ranges (Standard error) for causing the disease as recorded at Sadar Anwara upazila of Chittagong. The highest fruit infection of soft rot of potato (43%) was recorded at Dohazari, Chandanaish upazila in Chittagong. The average of higher disease severity of leaf (27%) and fruit (33%) was recorded in early blight of tomato and soft rot of potato, respectively, and the highest disease severity of leaf (29%) and fruit (35%) was recorded in *Phomopsis* blight and early blight of tomato and soft rot of potato, respectively.

Keywords : Diseases, vegetable, fruit, survey.

Introduction

Bangladesh is an agrarian country. Its economy is mainly dependent on agriculture. Crop loss owing to the diseases poses a great threat to Bangladesh agriculture. More than 454 diseases in around 100 cultivated crops have so far been recorded in Bangladesh (Anon., 2006). The diseases cause substantial losses to crops. These enormous losses hamper the total yield production of the country.

Generally, 30-50% loss is incurred due to the disease (Khan, 1999). Approximately 15-20% in general and 30-50% in severe case of fruit rots of eggplant is caused seriously due to the *Phomopsis vexans* (Das, 1998; Khan, 1999) and about 80 million taka is lost by this disease (Anon., 2003). The magnitude of yield loss depends upon the intensity of the disease. The amount of crop and fruit losses owing to a particular disease varied from place to place because of the existence of different races, biotypes, or strains of the pathogen (Sastry and Hegde, 1989). Chittagong region includes hilly district of

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Bangladesh, the hilly areas of Chittagong fall under the agro-ecological zone number 29. Agroclimatic conditions of the region is different from the other parts of the country. Very little survey on disease of vegetables and fruits was done previously in Chittagong region. Only at Dohazari, 60% eggplant infection and 20% fruit infection owing to *Phoinopsis vexans* were recorded (Meah, 2007). In view of above facts, the present study was undertaken to survey the information on incidence and severity of the diseases of vegetable and fruit crops in Chittagong region of Bangladesh.

Materials and Method

The survey was conducted in Chittagong region during October 2006 to June 2008. The incidence and severity of different diseases were recorded. Disease assessments were done in 1000 farmers' fields in 10 locations of 10 upazilas of Chittagong regions. The study areas were Mirjapur, Hathazari, Nazirhat, Fatikchury, Amilaish, Satkania: Dhol ghat, Patia, Sadar, Anara, Binajuri. Raozan, Ranirhat, Rangunia, Oyahedpur, Mirshary, Harabkunda, Sitakunda, and Dohazari, Chandanaish. In every area, 100 plants of vegetables and fruits were evaluated in the farmers' fields. Diseases were recorded in Kharif and Rabi seasons both on leaf and fruit. The incidence and severity data were the mean value of leaf and fruit infection of two years' assessment. Data were expressed in percentage. The formula in calculating the disease incidence and severity is:

$$\% \text{ Leaf / fruit infection} = \frac{\text{Number of Leaves/Fruit infected} \times 100}{\text{Total Number of leaves/Fruit counted}}$$

$$\text{PDI for severity} = \frac{\text{Sum of all disease ratings} \times 100}{\text{Total number of leaves/fruits} \times \text{maximum rating value}}$$

For estimation of leaf and fruit area diseased, the whole fruit and leaf surface area was considered as 100 and thereby the infected area was determined by eye estimation for Percent of Disease Index (PDI), i.e. severity. By the scale of Islam *et al.* (1990) for *Phomopsis* blight, Nene *et al.* (1982) for sclerotium wilting. Anon. (1974) for early blight of tomato, Saha, (2001) for white rust and anthracnose of amaranthus and chili and *Alternaria* blight for radish, Goncalves *et al.*, (1997) for leaf spot and rust for bean and anthracnose of mango, Anon. (2001) for sigatoka of banana, Kader and Ranhman (2001) for anthracnose of guava and Anon. (2008) for measuring the PDI of other diseases were maintained properly. Anthracnose of papaya and banana, stem-end rot of mango and soft rot of potato diseases were evaluated in post harvest condition collected from local market of Hathazari and Reazuddin Bazar of Chittagong. Data were analyzed for descriptive statistics, such as mean, mode, standard deviation, and standard error following Microsoft Excel package program.

Results and Discussion

Incidence and severity are the tools for measuring the diseases. Twenty four diseases were recorded in Chittagong region. The highest leaf incidence (43%) as recorded from the early blight of tomato at Sadar Anawara upazila followed by early blight of potato (41%) at Dohazari. Chandanaish and Phomopsis blight (39%) in Dhol ghat, Patia upazila. The average of 37% in early blight of tomato

Table 1. Disease incidence on leaf of vegetable and fruits at different locations of Chittagong.

Name of the disease	Mean	Mode	Sd	Se (\pm)
Phomopsis blight of eggplant	35	35	3.50	0.35
Early blight of tomato	37	36	4.32	0.43
Alternaria blight of cabbage	25	26	2.40	0.24
Early blight of potato	37	37	2.45	0.25
Soft rot of potato	-	-	-	-
White rust of amarnathus	14	14	2.45	0.25
Anthracnose of amarnathus	15	15	3.05	0.31
Anthracnose of chili	14	14	1.15	0.12
Alternaria blight of radish	22	22	2.83	0.28
Cercospora leaf spot of bean	24	24	1.63	0.16
Rust of bean	27	27	3.09	0.31
Anthracnose of bottle gourd	11	11	0.94	0.09
Alternaria blight of cauliflower	21	21	1.76	0.18
Cercospora leaf spot of spinach	24	24	1.76	0.18
Anthracnose of mango	25	25	1.15	0.12
Stem-end rot of mango	-	-	-	-
Anthracnose of guava	26	26	1.76	0.18
Anthracnose of litchi	19	19	2.00	0.20
Rhizopus rot of jackfruit	-	-	-	-
Anthracnose of papaya	-	-	-	-
Scab of lemon	11	11	0.94	0.09
Sigatoka of banana	24	24	1.15	0.12
Panama of banana	19	19	1.33	0.13
Anthracnose of banana	-	-	-	-

Note: Sd = Standard deviation, Se = Standard Error.

and early blight of potato was recorded. The deviation of the disease incidence of early blight of tomato and early blight of potato was 4.32% and 2.45%,

respectively. More frequency (mode) of the early blight of tomato and early blight of potato was 36%, and 37%, respectively, at different locations. Besides, the lowest leaf incidence (9%) was observed on the scab of lemon in Sadar Anwara upazila followed by anthracnose of bottle gourd at different locations (Mirjapur, Hathazari; Sadar Anwara; Ranirhat, Rangunia; Barabkunda, Sitakuiida; Dohazari Chandanaish), anthracnose of chilli and white rust in Mirjapur, Hathazari and Barabkunda, Sitakunda. The average of leaf incidence was 11% as detected in scab of lemon and anthracnose of bottle gourd. The standard deviation of the scab of lemon was 0.94 of the disease (Table 1).

Table 2. Disease incidence on fruit in vegetable and fruits at different locations of Chittagong.

Name of the disease	Mean	Mode	Sd	Se (\pm)
Phomopsis blight of eggplant	33	36	4.16	0.42
Early blight of tomato	37	30	2.98	0.30
Alternaria blight of cabbage	-	-	-	-
Early blight of potato	37	27	1.63	0.16
Soft rot of potato	39	39	2.45	0.25
White rust of amarnathus	-	-	-	-
Anthracnose of amarnathus	-	-	-	-
Anthracnose of chilli	22	21	2.26	0.23
Alternaria blight of radish	-	-	-	-
Cercospora leaf spot of bean	22	22	2.16	0.22
Rust of bean	12	11	1.05	0.11
Anthracnose of bottle gourd	15	15	0.94	0.09
Alternaria blight of cauliflower	-	-	-	-
Cercospora leaf spot of spinach	-	-	-	-
Anthracnose of mango	23	23	1.94	0.19
Stem-end rot of mango	16	16	1.33	0.13
Anthracnose of guava	27	27	2.36	0.24
Anthracnose of Litchi	20	20	2.16	0.22
Rhizopus rot of jack fruit	24	25	2.11	0.21
Anthracnose of papaya	12	12	0.82	0.08
Scab of lemon	17	17	2.31	0.23
Sigatoka of banana	-	-	-	-
Panama of banana	-	-	-	-
Anthracnose of banana	13	13	4.29	0.43

Note: Sd = Standard deviation, Se = Standard Error.

The highest disease incidence (43%) was recorded from soft rot of potato in Dohazari Chandanaish upazila followed by Phomopsis blight (39%) in Barabkunda. Sitakunda upazila. The lowest fruit disease incidence (11%) was recorded from anthracnose of banana (Nazirhat, Fatikchur). anthracnose of papaya (Nazirhat, Fatikchury; Sadar Anwara, Ranirhat. Rangunia) followed by anthracnose of bottle gourd (14%) in Amilaish, Satkania; Binajuri, Raozan and Oyahedpur, Mirshary. The average higher fruit disease incidence (39%) was recorded from the soft rot of potato which deviated 2.45% among different locations with ranges $\pm 0.25\%$ for causing diseases (Table 2).

Table 3. Disease Severity (PDI) on leaf in vegetable and fruits at different locations of Chittagong.

Name of the disease	Mean	Mode	Sd	Se (\pm)
Phomopsis blight of eggplant	25	25	2.16	0.22
Early blight of tomato	27	27	1.56	0.16
Alternaria blight of cabbage	25	25	1.49	0.15
Early blight of potato	26	26	1.15	0.12
Soft rot of potato	-	-	-	-
White rust of amarnathus	15	14	1.05	0.11
Anthracnose of amarnathus	13	13	1.15	0.12
Anthracnose of chili	10	10	0.82	0.08
Alternaria blight of radish	18	18	1.15	0.12
Cercospora leaf spot of bean	21	21	1.15	0.12
Rust of bean	15	14	1.05	0.11
Anthracnose of bottle gourd	12	12	1.15	0.12
Alternaria blight of cauliflower	18	18	1.15	0.12
Cercospora leaf spot of spinach	22	21	1.05	0.11
Anthracnose of mango	22	22	1.15	0.12
Stem-end rot of mango	-	-	-	-
Anthracnose of guava	25	25	1.15	0.12
Anthracnose of Litchi	19	19	1.15	0.12
Rhizopus rot of jack fruit	-	-	-	-
Anthracnose of papaya	-	-	-	-
Scab of lemon	13	13	1.41	0.14
Sigatoka of banana	22	22	1.76	0.18
Panama of banana	16	16	0.94	0.09
Anthracnose of banana	-	-	-	-

Note: Sd = Standard deviation, Se = Standard Error.

On the contrary, the highest percent of disease index i. e. severity in leaf and fruit as 20% and 35%, respectively, in case of Phomopsis blight of eggplant and early blight of tomato and early blight of potato. The lower severity of leaf and fruit was 11% as recorded from scab of lemon and anthracnose of bottle gourd. The higher average severity of leaf and fruit was 27% and 33%, respectively, as recorded from early blight of tomato and soft rot of potato (Table 3 and 4).

Table 4. Disease severity (PDI) on fruit in vegetables and fruits at different locations of Chittagong.

Name of the disease	Mean	Mode	Sd	Se (\pm)
Phomopsis blight of eggplant	23	22	2.40	0.24
Early blight of tomato	24	24	1.15	0.12
Alternaria blight of cabbage	-	-	-	-
Early blight of potato	22	22	1.15	0.12
Soft rot of potato	33	33	1.25	0.13
White rust of amarnathus	-	-	-	-
Anthracnose of amarnathus	-	-	-	-
Anthracnose of chili	15	15	1.15	0.12
Alternaria blight of radish	-	-	-	-
Cercospora leaf spot of bean	19	19	1.15	0.12
Rust of bean	11	11	1.15	0.12
Anthracnose of bottle gourd	13	14	1.33	0.13
Alternaria blight of cauliflower	-	-	-	-
Cercospora leaf spot of spinach	-	-	-	-
Anthracnose of mango	27	27	1.25	0.13
Stem-end rot of mango	22	22	1.94	0.09
Anthracnose of guava	27	27	1.41	0.14
Anthracnose of Litchi	18	18	0.94	0.09
Rhizopus rot of jack fruit	21	21	0.94	0.09
Anthracnose of papaya	17	17	1.05	0.11
Scab of lemon	15	15	1.41	0.14
Sigatoka of banana	-	-	-	-
Panama of banana	-	-	-	-
Anthracnose of banana	11	11	1.15	0.12

Note: Sd = Standard deviation, Se = Standard Error.

Sometimes, the disease information of the study on incidence and severity agreed with the reviewed literature. According to Das (1998), about 15-20% in general and 30-50% in severe case of fruit rots of eggplant were caused seriously due to Phomopsis blight. It was mostly similar to the record of study against the disease in the study areas. But, no detailed research findings on disease records were done keenly in Chittagong regions previously. Only at Dohazari 60% plant

infection and 20% fruit infection owing to *Phomopsis vexans* was recorded in Chittagong region (Meah, 2007). Sastry and Hegde (1989) stated that the amount of crop and fruit losses to a particular disease varied from place to place because of the existence of different races, biotypes, or strains of the pathogen. So, the incidence and severity of vegetables and fruits can differ in the different locations of Chittagong.

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