

PREVALENCE OF STEM CANKER AND BLACK SCURF DISEASE OF POTATO IN BANGLADESH

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Abstract

Extensive survey was conducted in major potato growing areas of Bangladesh during 1999-2000 and 2000 - 2001 to record the incidence of stem canker and black scurf disease of potato caused by *Rhizoctonia solani*. A total of about 109 ha of land representing 36 upazillas of 18 districts were surveyed. The highest disease incidence (23.99 %) was recorded in Kaliakoir upazilla and the lowest (1.84 %) was observed in Raipur upazilla. District wise, the maximum disease incidence was observed in Jamalpur (18.45 %) and the minimum in Narshingdi (2.40 %). The mean incidence of stem canker and black scurf disease of potato in the surveyed areas of Bangladesh was 8.40%. Diamant was found to be the most widely cultivated potato variety followed by Cardinal. Other crops which were cultivated as alternate or successive crops in the potato growing areas were different cereals, pulses, tobacco and vegetables, jute, etc.

Potato is one of the most important crops in Bangladesh. During 1999 - 2000, the production of potato was 2.93 million metric tones from 0.243 million hectares of land in Bangladesh. Average tuber yield is lower compared to other potato growing countries of the world (Beukema and Van der Zaag 1990, Chakrabarti *et al.* 1995). Stem canker and black scurf caused by *Rhizoctonia solani* Khun is one of the most destructive diseases of potato. Black sclerotia on the surface of the tuber and sunken necrotic lesions on roots, stems and underground parts of potato plants are common symptoms of *Rhizoctonia* disease (Carling and Leiner 1986). The global yield losses caused by *R. solani* were estimated to 5-15% (Stachiwicz *et al.* 1978). The disease was prevalent in most potato producing areas of the world (Gudmestad *et al.* 1978, Dillard *et al.* 1993, Ahmad *et al.* 1995). In Bangladesh, there is no systematic survey report regarding the prevalence of the stem canker and black scurf disease of potato. Reports regarding the prevalence of the disease are very essential to develop management strategy. Considering these facts the present study was carried out to assess the prevalence of the disease throughout the major potato growing areas in Bangladesh.

The survey was conducted during 1999 - 2000 and 2000 - 2001 cropping seasons. A total of 36 upazillas from 18 districts, 1 - 5 upazillas under each district, 2 - 3 mouzas under each upazilla and ten potato fields under each mouza were selected for this purpose. At each of the fields 10-12 spots were selected randomly. Diseased fields were detected based on visible symptoms of stem canker on stem and black scurf on tuber. For stem canker of plants each field spot was represented 1m² area. Isolation and identification of the causal fungus from the infected plants/tubers were done as and when necessary. All the plants of representative area were considered for data recording. Black scurf of tuber was determined when a potato field was for harvesting. For black scurf disease 100 tubers was randomly taken from each selected spot of the field. Data on area surveyed, variety grown, total number of plants and number of infected plants in each spot, number of infected tubers/100 tubers in each spot, previous crop history were recorded at the time of survey. Per cent of stem canker and black scurf incidence was estimated following.

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Table 1. Occurrence of black scurf and stem canker disease of potato in major potato growing areas of Bangladesh

| Districts/ Upazilla | Area surveyed (ha) | Disease incidence (%) | | Variety cultivated | Other crops sowed |
|------------------------|--------------------------|--------------------------|--------------|-------------------------------|---|
| | | Mean | Range | | |
| Chandpur | | | | | |
| Kachua | 2.30 | 8.18 | 0 - 21.01 | Diamant | Rice, vegetables |
| Comilla | | | | | |
| Chandina | 3.66 | 12.36 | 0 - 52.08 | Diamant | Rice, vegetables |
| Burichong | 3.76 | 8.24 | 0 - 31.50 | Diamant, Cardinal, Granola | Rice, vegetables |
| Debidwer | 2.68 | 2.55 | 0 - 9.98 | Diamant | Rice, vegetables |
| Daudkandi | 3.50 | 23.08 | 4.97 - 49.33 | Diamant, Multa, Patronies | Rice, jute, vegetables, mustard |
| Munshigonj | | | | | |
| Lohajong | 4.12 | 5.03 | 0 - 15 | Diamant, Multa, Patronies | Rice, shola |
| Srinagar | 2.68 | 4.59 | 0 - 19.66 | Diamant | Rice, shola |
| Shirajdikhan | 3.25 | 7.25 | 0 - 13.59 | Diamant | Rice, jute |
| Gazaria | 4.38 | 21.83 | 3.31 - 53.87 | Diamant | Rice, groundnut, jute, vegetables, wheat |
| Gazipur | | | | | |
| Sadar | 2.83 | 13.33 | 1.28 - 26.60 | Diamant | Rice, vegetables |
| Kaligonj | 1.83 | 3.93 | 0 - 15.10 | Diamant | Rice, vegetables, groundnut |
| Kaliakoir Narsingdi | 2.85 | 23.99 | 5.89 - 35.46 | Diamant | Rice, vegetables |
| Monohordi | 2.14 | 2.95 | 0 - 7.9 | Local | Rice, wheat |
| Raipur | 2.09 | 1.84 | 0 - 9.09 | Local | Rice, vegetables, wheat |
| Kishorgonj | | | | | |
| Bhairab | 3.49 | 3.52 | 0 - 12 | Local, Diamant | Rice, vegetable, groundnut |
| Jamalpur | | | | | |
| Sadar | 3.86 | 18.45 | 2.98 - 37.94 | Diamant, | Rice, maize, jute, wheat, mustard |
| Tangail | | | | | |
| Dhanbari | 3.18 | 2.30 | 0 - 9.98 | Diamant | Rice, wheat, mustard |
| Modhupur | 1.22 | 4.38 | 0 - 12.35 | Diamant | Rice, vegetables, mustard |
| Faridpur | | | | | |
| Boalmari | 3.20 | 2.83 | 0 - 8.61 | Diamant | Rice, lentil, jute, |
| Jessore | | | | | |
| Sadar | 3.81 | 4.50 | 0 - 11.09 | Diamant, Raja | Rice, vegetables, jute |
| Jikorgasa | 3.50 | 9.35 | 0 - 19.79 | Diamant, Cardinal | Rice, jute, vegetables |

| | | | | | | |
|-------------------|--------|-------|--------------|----------------------------------|--------------------------|----------|
| Rajshahi | | | | | | |
| Paba | 2.50 | 11.38 | 0 - 16.93 | Diamant, Cardinal | Rice, vegetables | |
| | | | | | | (Contd.) |
| (Contd.) | | | | | | |
| Joypurhat | | | | | | |
| Sadar | 2.85 | 5.60 | 0 - 18.23 | Local, Kufri, Cardinal, Diamant | Rice, vegetables | |
| Bogra | | | | | | |
| Sadar | 3.40 | 7.52 | 0 - 16.92 | Local, Kufri, Cardinal, Diamant | Rice, vegetables | |
| Shibgonj | 3.33 | 5.50 | 0 - 17.10 | Local, Kufri, Cardinal, Diamant | Rice, vegetables, banana | |
| Santahar | 2.59 | 11.64 | 2.12 - 21.23 | Local, Kufri, Cardinal, Diamant | Rice, vegetables | |
| Gobindagonj | 3.50 | 4.32 | 0 - 16.13 | Local, Kufri, Cardinal, Diamant | Rice, vegetables, banana | |
| Sadullaur | 2.90 | 7.75 | 0.89 - 16.23 | Local, Cardinal, Diamant | Rice, vegetables | |
| Rangpur | | | | | | |
| Sadar | 3.40 | 8.83 | 0 - 21.61 | Local, TPS, Cardinal, Diamant | Rice, wheat, tobacco | |
| Taragonj | 3.83 | 14.85 | 0 - 26.98 | Local, Cardinal, Diamant | Rice, wheat, tobacco | |
| Mithapukur | 2.25 | 7.75 | 0 - 18.25 | Local, TPS, Cardinal, Diamant | Rice, wheat, tobacco | |
| Pirgonj | 2.75 | 8.35 | 0 - 19.67 | Local, TPS, Cardinal, Diamant | Rice, wheat, tobacco | |
| Nilphamari | | | | | | |
| Sadar | 2.93 | 8.56 | 0 - 21.06 | Local, Cardinal, Diamant | Rice, wheat, tobacco | |
| Syedpur | 2.27 | 7.06 | 0 - 15.49 | Cardinal, Diamant | Rice, wheat, | |
| Dinajpur | | | | | | |
| Sadar | 2.89 | 9.45 | 1.23 - 20.66 | Local, Cardinal, Diamant | Rice, wheat | |
| Panchagar | | | | | | |
| Debigonj | 3.37 | 10.63 | 0.98 - 18.93 | Heera, Dheera, Cardinal, Diamant | Rice, wheat | |
| Total | 109.09 | 8.40 | 0 - 53.87 | | | |

A total of 109.09 hectares of potato fields were surveyed for determination of the disease incidence of stem canker and black scurf disease of potato. The highest disease incidence 23.99% was recorded in Kaliakoir upazilla of Gazipur, which was followed by Daudkandi of Comilla and Gazaria of Munshigonj. The lowest disease incidence 1.84% was observed in Raipur of Narshingdi district. The maximum disease incidence 18.45% was recorded in Jamalpur and the minimum 2.40% was recorded in Narshingdi district. Some of the surveyed potato fields were found totally free from stem canker and black scurf disease while maximum disease prevalence (53.87%) was recorded in a field of Gazaria upazilla under Munshigonj district. The average incidence of stem canker and black scurf disease of potato it was found 8.40%. The varieties cultivated in the surveyed areas were Cardinal, Diamant, Dheera, Granola, Heera, Kufri, Multa, Patronies, Raja, TPS, and local varieties. The variety Diamant was found to be cultivated in of 34

upazillas, Cardinal in 14 upazillas and local varieties in 16 surveyed upazillas. Both the local and HY varieties were infected by the pathogen of stem canker and black scurf disease. The farmers cultivated different other crops like rice, jute, vegetables, maize, mustard etc. in potato fields as alternate crop or after harvest as successive crop (Table 1).

It was revealed from the study that black scurf and stem canker diseases were prevalent throughout the potato growing areas of the country. The disease occurrence varied region to region, even from location to location within the same region.

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