

SEED EMERGENCE EFFICIENCIES OF VEGETABLES SEEDS AVAILABLE IN MYMENSINGH SADAR UPAZILA, BANGLADESH

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ABSTRACT

Three vegetables and 3 varieties of each vegetable viz. seeds of Country bean (IPSA-1, BARI-4 and Noldog); Brinjal (Deghri, Uttara and Singhath); and Tomato (Raton, Ruma VF and Jalali) were taken under testing to know the seed emergence efficiencies of available vegetable seeds in Mymensingh Sadar upazila of Bangladesh. To carry out the study during the period from September, 2016 to November, 2016 experimental vegetable seeds were collected from four different seed companies such as Ispahani Agro limited, Lal Teer Seed Company limited, Krishan Agro Service and Supreme Seed Company limited. The seed emergence efficiencies were determined in the laboratory of the Department of Seed Science and Technology and Eco-friendly Plant Disease Management Laboratory; Bangladesh Agricultural University (BAU), Mymensingh in respect of moisture content, 1000-seed weight and seed germination percentage. The moisture content varied significantly from one to another, while minimum (8.34%) and maximum (12.60%) records were made in Jalali (tomato) and IPSA-1(country bean), respectively. In respect of 1000-seed weight, minimum 1000-seed weight (0.70g) was found in variety Ruma VF (tomato), but maximum 1000-seed weight (1130g) was recorded in BARI-4 (country bean). In case of germination of vegetables seeds of normal seedlings of different seed companies ranged from 50.00 to 66.00%. The highest percentage of normal seedlings was found 66.00% in variety Ruma VF (tomato) collected from Krishan Agro Service and the lowest 50.00% in variety BARI-4 (country bean) collected from Ispahani Agro limited.

Key words: Vegetable seeds, seed moisture, seed germination, variety.

Introduction

Bangladesh is predominantly an agriculture based country with more than 149 million peoples living on 14.84 million hectares of land. Population is expected to increase to 200 million by 2050. Agriculture is still the largest employment sector and it accounts for 32% of its gross domestic product (GDP) and absorbs 63% of the country's labor force (Winberger and Genova, 2006). The performance of this sector affects the overall economic growth. Crops share about 23% of total GDP. The net cropped area is about 14 million hectares and the cropping intensity is more than 180%. 'Vegetables' constitute a potential and important group of crops in Bangladesh. Vegetables are important for their low cost of production, short duration of production and high nutritive value. In 2013-2014 about 926 ('000') acres of land were under vegetable cultivation in Bangladesh and production was 3365 ('000') tons (BBS, 2014). But it is the matter of concern that about 200 different seed-borne pathogens including more than 100 fungi have been reported to cause diseases in different vegetable crops in the world (Richardson, 1990). Sultana (2009) estimated eight seed borne fungi associated with the seeds of Bottle gourd, Sweet gourd, Snake gourd, Ridge gourd, Cucumber, Wax gourd and Sponge gourd collected from BADC and other seed company. She found that only *Aspergillus spp.* was highly prevalent in all the crop seeds ranging from 1.6-14%. A total of 18 seed-borne fungal pathogens have been reported from the seeds of four selected crops, of these; 10, 4, 2 and 2 fungal pathogens have been found associated with the seeds of Spinach, Bottle gourd, Indian spinach and Red amaranth, respectively at home and abroad (Fakir *et al.*, 1991 and Islam, 2005). It is unquestionable that proper disease control measures should be taken for the production of quality seeds. Healthy or pathogen free seeds are considered as the vital factor for desired plant population and good harvest. Seeds of vegetables are more vulnerable to attack by pathogens and quickly deteriorate in storage. Seed health, an essential component of seed quality is important for seed germination; seedling vigour and plant stand in

the field and thereby crop/seed production. Quality seed means not only considered germination percentage, moisture, purity percentage but also health of seed. Use of good seeds can contribute to increase vegetable yield as high as 30% remaining all other factors of production as content (Khanom, 2011). Use of healthy seeds may open a new era in desired vegetable production. One important environmental factor, with major effects on fungal activity, is water availability. Water potential is a measure of how much energy is required to extract water from a substrate. Moisture and temperature are the two factors which affect on germination of seed. The seeds of untrained farmers had very low germination (62.2%), the highest number of diseased (6.8%), abnormal seedlings (6.75%) and lowest number of normal seedlings (48.6%). However, information about the health and quality vegetables seeds of Bangladesh is still rare. Keeping the above facts in consideration the present work has been undertaken to check the quality of vegetable seeds used by farmers of Mymensingh sadar upazila in Mymensingh district regard to secured vegetables consumption and ensuring sound health of Bangladesh people.

Materials and Methods

The experiment pertaining to the present investigation was carried out in the Seed Science & Technology Lab, Department of Seed Science & Technology, Bangladesh Agricultural University (BAU), Mymensingh. The experiment was conducted during the period from September, 2016 to November, 2016. Three vegetables and 3 varieties of each vegetable were selected for conducting the experiment (Table 1).

Table 1. Name of vegetables, variety and their sources of collection

| Sl. No. | Vegetables | Variety | Seed source |
|---------|--------------|-----------|-------------------------------|
| 1 | Country bean | IPSA-1 | Ispahani Agro limited |
| 2 | Do | BARI-4 | Ispahani Agro limited |
| 3 | Do | Noldog | Supreme Seed Company limited |
| 4 | Brinjal | Debgiri | Krishan Agro Service |
| 5 | Do | Uttara | Lal Teer Seed Company limited |
| 6 | Do | Singhnath | Lal Teer Seed Company limited |
| 7 | Tomato | Raton | Supreme Seed Company limited |
| 8 | Do | Ruma VF | Krishan Agro Service |
| 9 | Do | Jalali | Krishan Agro Service |

These varieties are usually used by the local farmers of Mymensingh sadar thana

Collection of seed sample: Seed samples were collected from different seed companies' viz. Ispahani Agro limited, Krishan Agro Service, Lal Teer Seed Company limited and Supreme Seed Company limited.

Determination of moisture content: Moisture content of the collected seed samples were determined with the help of electronic moisture meter before preserving the seed in seed storage at Eco-friendly Plant Disease Management Laboratory, Department of Plant Pathology, BAU, Mymensingh and the moisture content of seed was expressed in percentage.

Determination of 1000-seed weight: For each seed sample 1000 seed-weight was taken with the help of electronic balance. The seed weight was taken after counting 1000- seed at Eco-friendly Plant Disease Management Laboratory and expressed in percentage.

Germination test: Germination test was done in the Laboratory of the Department of Seed Science and Technology, BAU, Mymensingh using plate method. A total of 200 seeds were set for germination test in each variety according to ISTA rules for testing germination of seeds. Germination was recorded twice at 4 and 8 days after sowing. Total germinated seeds, normal seedlings, abnormal seedlings and non-germinated seed were counted and expressed in percentage.

Statistical analysis: The data collected from the experiments were analyzed for test of significance and compared the treatment means by using Duncan's Multiple Range Test (DMRT) at 5% level of probability following the MSTAT-C program.

Results and Discussion

Moisture Content: Moisture content of the collected vegetables seeds are presented in Table 2. The moisture content of the seed sample ranged from 8.34 to 12.60%, where the highest percentage (12.60%) of moisture content was found in variety IPSA-1(country bean) and the lowest percentage (8.34%) in Jalali (tomato). Significantly highest moisture content was found in seed samples collected from Ispahani Agro. Ltd. and the lowest in seed sample collected from Krishan Agro Service. According to Henderson and Christensen (1961), the upper limits of moisture content of rice seeds generally considered safe for long time storage under average condition was 13%. Uddin (2005) determined moisture content of farmers seeds of Begumgonj upazilla of Noakhali that ranged from 11.86 to 13.83%. Fakir *et al.* (2002) determined the moisture content of farmers seeds collected from Rajshahi, Bogra and Rangpur. They reported that moisture content of farmer's seed of 2002 ranged from 7.0 to 13.9% varying with respect to crop season, farmers and locations of seed collection.

1000-Seed Weight: 1000-seed weight of fifteen vegetables seeds collected from different seed companies were analyzed and also presented in Table 2. The 1000-seed weight was ranged from 0.70 to 1130 g. significantly highest weight (1130g) of 1000-seed was recorded in BARI-4 (country bean) and the lowest (0.70g) in RumaVF (tomato). The highest weight of 1000 seed was recorded in seeds samples collected from Ispahani Agro limited and the lowest weight of 1000-seed was recorded in seeds samples collected from Krishan Agro Service. The finding of this present study was supported by Mian and Fakir (1989).

Table 2. Moisture status and 1000-seed weight of vegetables seeds collected from different seed companies

| Sl. No. | Vegetables | Variety | Moisture Content (%) | 1000-seed weight (g) |
|-----------------------|--------------|-----------|----------------------|----------------------|
| 1 | Country bean | IPSA-1 | 12.60 b | 1095 b |
| 2 | | BARI-4 | 11.90 bc | 1130 a |
| 3 | | Noldog | 10.60 d | 1087 c |
| 4 | Brinjal | Debgiri | 12.10 bc | 0.89 d |
| 5 | | Uttara | 8.40 e | 0.95 d |
| 6 | | Singhnath | 12.50 b | 0.92 d |
| 7 | Tomato | Raton | 9.20 e | 0.77 e |
| 8 | | Ruma VF | 11.90 bc | 0.70 e |
| 9 | | Jalali | 8.34 e | 0.75 e |
| LSD _{0.05} | | | 0.875 | 3.95 |
| Level of significance | | | ** | ** |
| CV (%) | | | 4.51 | 2.66 |

Data represents the mean of three replications, Significant at 1% level of probability

Germination test

Normal seedlings: The percent normal seedlings of different seed companies ranged from 50.00 to 66.00% (Table 3), where the highest normal seedlings was recorded from the tomato seed sample of Krishan Agro Service and lowest normal seedlings were recorded from the seed sample of Ispahani Agro limited. In the respect of variety, the highest percentages (66.00%) of normal seedlings were in variety Ruma VF (tomato) and the lowest (50.00%) in variety BARI-4(country bean). Seeds of trained farmers confirm the maximum germination and also yielded maximum number of healthy seedlings.

Abnormal seedlings: The percent abnormal seedlings of different seed companies ranged from 18.00 to 38.00% (Table 3), where the highest abnormal seedlings was recorded from the tomato seed sample of Ispahani Agro limited and lowest abnormal seedlings were recorded from the seed sample of Krishan Agro Service. In the respect of variety, the highest percentage (38.00%) of abnormal seedlings was in variety BARI-4 (country bean) and the lowest (18.00%) in variety Singhnath (brinjal).

Table 3. Germination test of vegetables seeds collected from different seed companies

| Vegetables | Variety | % Normal seedling | % Abnormal seedling | % Non-germinated seeds |
|-----------------------|-----------|-------------------|---------------------|------------------------|
| Country bean | IPSA-1 | 56.00 c | 32.00 b | 12.00 e |
| | BARI-4 | 50.00 d | 38.00a | 14.00 d |
| | Noldog | 58.00 c | 34.00 b | 8.00 g |
| Tomato | Jalali | 64.00ab | 20.00 de | 16.00 c |
| | Raton | 58.00 c | 22.00cd | 20.00a |
| | Ruma VF | 66.00a | 24.00 c | 10.00 f |
| Brinjal | Uttara | 62.00 b | 20.00de | 18.00 b |
| | Singhnath | 64.00ab | 18.00 e | 18.00 b |
| | Debgiri | 64.00ab | 22.00 cd | 14.00 d |
| LSD _{0.05} | | 3.57 | 2.13 | 1.78 |
| Level of significance | | ** | ** | ** |
| CV (%) | | 3.46 | 4.88 | 7.20 |

Data represents the mean of three replications, Significant at 1% level of probability

Non germinated seed: The percent non germinated seed of different seed companies ranged from 8.00 to 20.00%, where the highest non germinated seed was recorded from the tomato seed sample of Supreme Seed Company limited and lowest non germinated seed were recorded from the country bean seed sample of Supreme Seed Company limited. In the respect of variety, the highest percentage (20.00%) of non germinated seed was in variety Raton (tomato) and the lowest (8.00%) in variety Noldog (country bean).

Conclusion

Based on the findings of the present study, it may be concluded that quality status of vegetables seeds collected from different seed companies were not so good. It's varies from seed to seed and varieties to varieties. Much more research is needed in this field to provide quality vegetables seeds to the farmers.

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