

Full Length Research Paper

Seed germination of seeds preserved for about 20 years and that of seeds preserved for several years

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From the herbage seeds, only alfalfa (*Medicago sativa*) showed about 3 - 5% germination ratio for 20 years old seeds. The results are consistent with that of Park and Kim (2009). No germination was observed from the other herbage species, but the decay of seeds were observed sometimes. However, the vegetable seeds preserved for several years showed high germination ratios. In conclusion, older seeds generally germinate a little, while alfalfa seeds continue to live for long time. In addition, new seeds generally germinate more, while, for example, young summer radish germinated a little.

Key words: Seed germination, *Medicago sativa*, genetic diversity, herbage seeds.

INTRODUCTION

There are several reports about genetic diversity, germplasm or seed of plant (Admas and Tesfaye, 2017; Ali et al., 2018; Arantes et al., 2018; Chalachew et al., 2017; Chandra et al., 2017; Daniel et al., 2017; Dilooshi et al., 2016; Santos et al., 2017; Ejigu et al., 2018; Emmanuel et al., 2018; Isaac et al., 2016; Lopez-Puc and Rodriguez-Buenfil, 2017; Revolti et al., 2018; Miccah et al., 2016; Mohammad et al., 2016; Mounawer et al., 2016; Mulima et al., 2018; Ochieng et al., 2015; Pacôme et al., 2016; Raimundo et al., 2015; Rodrigues et al., 2016; Tadesse et al., 2018; Titilayo et al., 2018; Zerihun et al., 2018), fungi (Edelvio, 2018; Ling et al., 2016;

Shubha and Srinivas, 2017), bacteria (Chaohe et al., 2015; Paul et al., 2016), and virus (Chikoti et al., 2015).

Investigation was carried on germination and growth of old alfalfa (*Medicago sativa* L.) seeds on soil (2009), seedling growth of some forages from their aged seeds (2012), survey on seed decay during their germination of some forages from their aged seeds' (2013). Recently, study was conducted on another germination test both with unaged vegetable seeds and with the old herbage (or forage) seeds. The purpose of this experiment was to know the viability of more advanced and older herbage (or forage) seeds compared to previous experiments, and

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Table 1. Herbage seeds preserved for about 20 years and vegetable seeds preserved for several years.

| Seed preserved for about 20 years | | |
|--|-------------------------------------|----------------------|
| Species | Scientific name | Year produced |
| Rapeseed | <i>Brassica napus var. velox.</i> | 1993 |
| Alfalfa | <i>Medicago sativa</i> | before 1993 |
| Birdsfoot trefoil | <i>Lotus corniculatus</i> | before 1993 |
| Red clover | <i>Trifolium pratense</i> | before 1993 |
| Orchardgrass | <i>Dactylis glomerata</i> | 1993 |
| White clover | <i>Trifolium repense</i> | before 1993 |
| Perennial ryegrass | <i>Lolium perenne</i> | 1990 |
| Sorghum hybrid | <i>Sorghum bicolor x S. bicolor</i> | 1993 |
| Seeds preserved for several years | | |
| Species | Scientific name | year produced |
| Garland chrysanthemum | <i>Chrysanthemum coronarium</i> | 2006 |
| Chard | <i>Beta vulgaris var. cicla</i> | 2006 |
| Nappa cabbage | <i>Brassica rapa</i> | 2005 |
| Spinach | <i>Spinacia oleracea</i> | 2006 |
| Young summer radish | <i>Raphanus raphanistrum</i> | 2005 |

Table 2. Germination ratio of plants.

| Plant condition | Weight (g) | Total | Germinated | Ratio (%) |
|------------------------|-------------------|--------------|-------------------|------------------|
| Spinach | - | 112 | 0 | 0 |
| Red clover | - | 200 | 0 | 0 |
| Red clover | 0.5247 | 260 | 0 | 0 |
| Birdsfoot trefoil | 0.249 | 150 | 0 | 0 |
| White clover | 0.1005 | 150 | 0 | 0 |
| White clover | 0.1115 | 173 | 0 | 0 |
| Alfalfa | - | 100 | 3 | 3 |
| Sorghum | - | 50 | 0 | 0 |
| Garland chrysanthemum | 0.750 | 100 | 50 | 50 |
| Garland chrysanthemum | 0.2839 | 110 | 50 | 50 |
| Young summer radish | 0.6617 | 54 | 1 | 2 |

to know viability of vegetable seeds preserved for several years after their harvest.

MATERIALS AND METHODS

Table 1 shows the Seed preserved for about 20 years and those preserved for several years. The herbage seeds were produced from the year 1991 to 1993, and the vegetable seeds from the year 2005 to 2006. Therefore, there was an interval of around 20 years. The date of this experiment was carried out for four weeks from March 14, 2013; three weeks from March 21, 2013; and one week from April 18, 2013. In addition, the number of seeds was from 50 to 260. After counting the seeds, they were placed in a soaked filter paper on Petri-dish, whose radius was approximately 10 cm. The petri-dish remained on the desk of the laboratory.

RESULTS AND DISCUSSION

From herbage seeds, only alfalfa (*Medicago sativa*) showed about 3 - 5% germination ratio for 20 years old seeds. The results are similar to that Park and Kim (2009). From the other herbage species, no germination was observed, but sometimes the decay of seeds were observed. However, some of the vegetable seeds preserved for several years showed high germination ratios. Table 2 shows germination ratio of plants. From the Table it is clear that older seeds germinates less than the new seeds preserved for several years. However, for example, young summer radish germinated only as much as 1 seed per 50 ones (Figures 1 to 5).



Figure 1. Germination of alfafa: 3-5 germinations among 100 seeds were observed.



Figure 2. Germination of sorghum hybrid. Seeds did not decay but there was no germination.



Figure 3. Germination of garland chrysanthemum. The seeds showed good germination.



Figure 4. Germination of nappa cabbage. The seeds showed a vigorous germination.

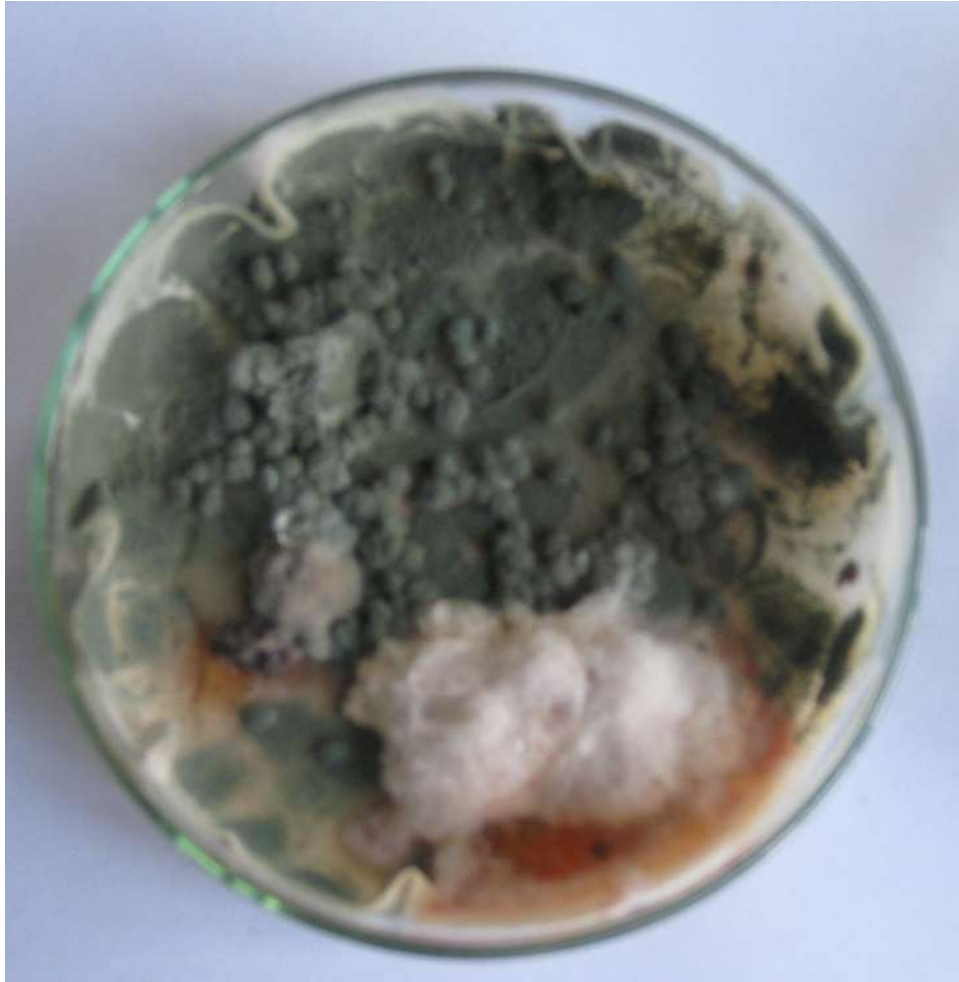


Figure 5. Germination of red clover. The red clover seeds showed whole decay during the germination. The reason of the decay seemed fungi.

Conclusion

As a conclusion, older seeds generally germinates slightly, while alfalfa seeds continue to live for long time. New seeds generally germinates more; whereas, young summer radish germinated a little.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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