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The basic rot diseases in onion during storage – intensity of their development and damages

Sardorjon E. Avazov

Tashkent State Agrarian University, Tashkent, Uzbekistan

E-mail: *mr.sardor_2010@mail.ru*

Abstract

In this paper the basic fungous diseases of onion during storage in various conditions of Uzbekistan are presented. It is positioned that the most harmful fungi in shelf-life of onion is botrytis rot, with agent *Botrytis allii* Munn. The degree of infection, the absolute loss of weight and the coefficient of harmfulness of this disease was much higher than all the other diseases of onion during storage (nearly 30 fungi species). The black rot disease, with agent *Aspergillus niger* (van Tiegh) is also considered as quite harmful to onion during storage.

Keywords: onion; storage; fungous diseases; botrytis rot; black rot; damage coefficient

INTRODUCTION

In Uzbekistan 70% of harvested onion is stored in storehouses. At this time onion stops vegetative stage and moves to dormancy stage, for this reason microorganism control immunity slightly decreases. That's why at the time when onion is in storage facultative parasites and saprophyte microorganisms begin the process of decay. According to the literary data 9-28% of storing onion can be lost from the influence of different diseases (Raju and Raj, 1980; Slusarska, 1981; Maude, 1983; Rath and Mohanty, 1985; Nikitina, 1986; Prasad et al., 1986). The purpose of the study was to identify the basic agents of onion rot during storage in Uzbekistan.

OBJECTS AND METHODS

Our research work was carried out on onion in storage mainly at natural ventilation, air-cooled by ventilators and artificially cooled conditions of onion storage at subsidiary enterprise "Tadbirkorishonch" in Olmazor district of Tashkent; Uzbek Research Institute of Vegetables, Melons and

Potatoes; Tashkent State Agrarian University and under domestic conditions. At these storehouses onion was kept in storing containers holding 420-450 kg and in sacks made from synthetic thread holding 25-30 kg.

The quantity of fruits and vegetables infected by fungi was estimated before taking into storehouse and during all the keeping time, in every 25-35 days, selective check was made. Healthy and sick vegetables were separated from each other. Then sick vegetables were weighed. The contamination of vegetables was estimated by 4 point system of Dementeva (1985) and the average index of disease's development was defined. Its % index of damage, absolute decrease of yield due to disease and damage coefficient were determined by the method of Chumakov et al. (1974).

RESULTS AND DISCUSSION

We have found that in the conditions of Uzbekistan onion rot during storage is caused by several different diseases. Among them the most harmful is botrytis rot or foot-rot disease, with agent *Botrytis*

allii Munn. Contamination of onion with this disease begins during its growth period. Fungus agent of the disease injures leaves of the external cover and root's dry tissues. In growth period onion is more resistant to botrytis rot disease. The disease and its development were seen clearly in 1-1,5 months after onion was taken into storehouse. Though in the period when onion was taken into storehouse the diseased onions were selected from healthy ones. As depository temperature (10-12°C) and humidity (85-90%) begin to increase the development of disease speeds up.

As seen from Table 1 each container contained 420 kg onion, of which 42,2 kg were infected by botrytis rot. When we expressed the degree of contaminated onion by points, it was 1 point - 4,7%, 2 point - 3,7%, 3 point - 1,1%, 4 point - 0,6%. Onion under the influence of disease lost 10,1% of weight, yield absolute damage was 3,4%, coefficient of disease damage was 0,2%.

Another disease causing damage in stored onion is black rot disease, caused by *Aspergillus niger* (van Tiegh). Black rot disease is more common in samples taken from stored onion mainly in natural ventilated storehouses, where it is impossible to be well-aired and humidity and temperature were high. At the same time this disease was observed in samples of unripened and not well-dried onions.

When we examine the cases of black rot disease occurrence in storehouse conditions, in samples which were taken from containers holding 420 kg, on average 14,3 kg of onion was infected by the disease (Table 1). Onion contamination was 1,9% - 1 point, 1,4% - 2 point, 0,1% - 3 point.

Onion under the influence of disease lost 14,3% of weight and the yield absolute damage was 3,4% and coefficient of damage was 0,2%.

The total weight of the other, more than 30 types of fungous disease, is at the same degree as the above-mentioned botrytis rot and black rot fungi. If the degree of onion disease rate is expressed by points, it was 1 point - 2,6%, 2 point - 1,8%, 3 point - 1,7%, 4 point - 0,1%. It is observed that general weight, lost by onion, was 5,2% and the yield absolute damage and coefficient of the disease damage weren't so high.

CONCLUSIONS

In the experiment, it was found that botrytis rot, with agent *Botrytis allii*, is the most dangerous rot disease and it causes greatest damages to onion during storage.

The second in importance is black rot disease, with agent *Aspergillus niger*. Its damage degree is

Table 1. Evaluation of average loss of weight in stored onion in containers containing 420 kg

| Diseases points | Botrytis rot | | Black rot | | Other diseases | | Absolute loss of yield | |
|-------------------------------|--------------|------|-----------|------|----------------|------|------------------------|------|
| | kg | % | kg | % | kg | % | kg | % |
| 0 (healthy) | 377,6 | 89,9 | 405,7 | 96,6 | 398,1 | 94,8 | 341,2 | 81,3 |
| 1 | 19,7 | 4,7 | 8,0 | 1,9 | 10,9 | 2,6 | 38,6 | 9,2 |
| 2 | 15,8 | 3,7 | 5,9 | 1,4 | 7,4 | 1,8 | 29,1 | 6,9 |
| 3 | 4,5 | 1,1 | 0,4 | 0,1 | 3,0 | 0,7 | 7,9 | 1,9 |
| 4 | 2,4 | 0,6 | - | - | 0,6 | 0,1 | 3,0 | 0,7 |
| Total infected | 42,4 | 10,1 | 14,3 | 3,3 | 21,9 | 5,2 | 78,8 | 18,7 |
| Coefficient of disease damage | | 2,3 | | 0,2 | | 0,8 | | 3,3 |

3-4 times smaller and the coefficient of the disease damage is 10 times smaller in comparison to botrytis rot.

It was found that the damage of the rest fungous diseases (more than 30 fungous diseases) was 2-3 times smaller in comparison to botrytis rot.

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