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Survey of purple blotch of onion in Latur and Osmanabad districts, India

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Abstract

Onion (*Allium cepa* L.), is one of the most popular vegetable crops grown throughout the world. Onion rightly called as “Queen of kitchen” is one of the oldest known and an important vegetable crop grown in India. Onion is supposed to have its origin in the Middle East Asian Countries and introduced in India from Palestine. As vegetable and spice it is used both as tender and mature bulb. Purple blotch of Onion caused by *Alternaria porri* (Ellis) is one of the most destructive diseases of onion (*Allium cepa* L.) causing accountable losses of about 80 to 90 percent. On the basis on survey, it is observed that during Kharif 2013 the incidence purple blotch of onion recorded in Latur and Osmanabad district in Marathwada region is affected have economic losses. Purple blotch incidence was recorded maximum in Osmanabad district (44.08%) followed by Latur district (35.20%). The disease incidence was varied among different stage of the crop and varieties grown but there was no significant difference among the cultivation practices. However, the highest average incidence was recorded most of the onion cultivars grown in the village were N-53 type of soil was black cotton.

Keywords: Onion, survey, purple blotch, *Alternaria porri*, Maharashtra

Introduction

Onion (*Allium cepa* L.), is one of the most popular vegetable crop grown throughout the world. The onion (*Allium cepa*) (Latin 'cepa' = onion), also known as the bulb onion or common onion, is used as a vegetable and is the most widely cultivated species of the genus *Allium*. Onion rightly called as “Queen of kitchen” is one of the oldest known and an important vegetable crop grown in India. Onion is supposed to have its origin in the Middle East Asian Countries and introduced in India from Palestine. In India onion is grown in almost all states, of which Maharashtra is one of the state growing onions on large scale.

It belongs to family *Alliaceae*, and genus *Allium* with about 300 species. As vegetable and spice it is used both as tender and mature bulb. In bulb group vegetables the most important crop is onion. The bulb is composed of concentric, fleshy, enlarged leaf bases or scales. The outer leaf bases lose moisture and become scaly and the inner leaves generally thicken as bulbs develop. It is consumed throughout the year by almost all classes of people on account of its medicinal and dietary value. Due to this blood pressure, diabetes, increasing blood fat are controlled. Onions are cultivated and used around the world. As a foodstuff they are usually served cooked, as a vegetable or part of a prepared savory dish, but can also be eaten raw or used to make pickles or chutneys. They are pungent when chopped and contain certain chemical substances which irritate the eyes. Onions contain phenolics and flavonoids that have potential antiinflammatory, anticholesterol, anticancer and antioxidant properties. The young green onions are used as salad, while the mature bulbs are used as food for cooking vegetables. White or yellow onion bulbs are dehydrated and used for manufacturing of powder. This has more value and demand in European countries. There are many industries in Maharashtra and Gujarat for manufacturing salad and powder. About 5-6 Lakh ton onion is exported and from this India gets Rs 300-400 Crores.

Onion is grown in three seasons i.e., *Kharif*, *Rabi* and Summer. In *Kharif* seasons, during May-June seeds are sown and transplanted during July –Aug months and onion become ready for harvesting during Oct- Nov months. About 20 Percent of total area is under season. *Kharif* season onions are cultivated mainly in major countries i.e., China, India, USA, France, Japan, Korea, Brazil, Spain and Pakistan. And in Maharashtra in Satara, Nashik, Manmad, Nifad and in the district of Ahmadnagar in Sangamner, Rahuri, Parner, Shrigonda, and Patherdi. The crop is grown in the area where rainfall is 500-550 mm and for growth of onion temperatures during night are about 17-18 °C and during day time temperature at about 30-33 °C are

required. On the basis of skin color there are three types of onion i.e., Red, Yellow and White. The red color of onion is due to pigment 'anthocyanin' and yellow color is due to 'quercertin' pigment. The pungency of onion is due to volatile oil 'allyl propyl disulphide. Flavor in onions is associated with pungency by propyl disulphide and other disulphide and with sugar content and pungency is related to percentage dry matter short day and long day types, the difference in their flavors pungency and dry matter are important quality attributes in onions for processing. Onion contains chemical and such as phenolic flavonoids, anti-inflammatory, anticholesterol, anticancer and antioxidant properties. The nutritive value of onion varies from variety to variety. The general analysis is given below per 100 gram of edible portion, Energy 40 Kcal, carbohydrate 9.34 g, sugar 4024 g, fiber 1.7 g, fat 0.1 g, protein 1.1 g water 89.1 g, (thiamin) vit. b1 0.046 mg, (riboflavin) b2 0.027 mg, (niacin) b3 0.116 mg, (panthemic acid) b5 0.123 mg, b6 0.12 mg, vit c 7.4 mg, magnesium 10 mg, manganese 0.12 mg, calcium 23 mg, phosphorous 29 mg, potassium 146 mg, zinc 0.17 mg.

Purple blotch (*Alternaria porri*) is one of the major constrains in onion cultivation. The pathogen is polyphagus infecting crop like onion, Garlic, Shallot and other *Allium* crops. High relative humidity (80 to 90%) and optimum temperature (24±1 °C) are needed for further development of purple blotch disease symptoms causing considerable yield losses and is seed borne pathogen causing up to 20-60 percent loss in bulb yield and extent of loss depend on time of infection and stage of of crop growth (Sudarshan Rao., 1975) [7]. reported losses of about 50 to 100 percent with relative occurrence of *Alternaria porri* (Ellis) Cif.

Typical symptoms of the disease appeared on foliage and foliage sheath are small white sunken spots develop on the leaves these enlarge, become zonate and under moist conditions turn purple these are also prominent on the inflorescence and stalks. Infection can cause a semi watery rot on necks of bulbs that turn yellow red in colour. Infected bulb tissues eventually become papery.

Materials and Methods

A roving survey of onion growing villages in Latur and Osmanabad districts was conducted from July to October 2013. The main objective of survey was to assess the percentage diseases severity of purple blotch, their relation with variety grown and soil types. The onion fields adjacent to road were selected for recording the disease severity. Frequency of plant count for percent incidence of onion-infected plants was at the rate of one count of 400 plants per 15-20 km distance. After entry in the onion field, a diagonal walk to square of field was done for 20 meter and lines of onion were chosen for counting 100 plants. Out of these numbers of plant, infected and healthy plants were recorded separately by making a right angle to previous chosen lines. A 20-meter walk was done and second lot of 100 plants was counted, Infected and healthy plants separately. Again, a right angle was made to second line of counting and walk of 20 meter was done to count the third lot of 100 plants. The count of purple blotch infected plants and healthy ones was noted separately. In each location the severity was recorded by using 0–9–point scale. Mayee and Datar (1986) [4] suggested almost similar method of counting. In addition to record of percent incidence of purple blotch, type of soil and Variety grown were recorded. Observation by using 0-9 point as:

(Mayee and Datar 1986) [4].

Scale	Description
0	No symptoms on the leaf.
1	Small brown spots scattered on the lesions 1% or less of the area
3	Lesions small, scattered, brown to black with concentric rings covering 1-10% of the leaf area.
5	Lesions small, scattered, brown to black with concentric rings covering 11-25% of the leaf aera.
7	Lesions enlarging and coalescing, lesions have concentric rings shot hole symptoms covers 26-50% of the leaf area.
9	Big, irregular concentric lesions brown to black colour covering 51% or more leaf area. Shot hole symptoms common. Collapse of seedling

$$\text{Incidence (\%)} = \frac{\text{No. of plants showing disease symptoms}}{\text{Total No. of plants/plot}} \times 100$$

Results and Discussion

During *Kharif*, 2013 a roving survey was conducted during the months of July to October in Latur and Osmanabad districts by selecting Onion fields adjacent to road, approximately at every 15-20 km distance. The intensity of disease was noted by counting at least 400 plants in each field. Observation on purple blotch intensity was recorded as, the symptoms expressed as of initial small, water soaked lesions of light yellow to brown colored. As the lesions expand, they coalesce and cause extensive brightening of the leaves. In advanced stage lesions are found in higher number on the sides of leaves facing the wind. The centers of lesions turn brown, due to abundant sporulation by the pathogen. The percent disease incidence was calculated by using 0–9–point disease rating scale. Twenty-four villages in Latur and twenty-four villages in Osmanabad district were surveyed for purple blotch severity, onion cultivar and soil type and recorded. Results indicated that (Table 1.a) the mean purple blotch average incidence in the Latur district (24 locations) during *Kharif*, 2013 was ranged from 22.00 to 50.00 percent. However, the highest average incidence was recorded at Panchincholi and Masalga and most of the onion cultivars grown in the village were N-53 type of soil was black cotton. District Average purple blotch incidence was 35.20 percent. Results indicated that (Table 1.b) the mean purple blotch incidence in the Osmanabad district during *Kharif*, 2013 was ranged from 36 to 60 percent. However, the highest purple blotch average incidence was recorded at Savargaon. And most of the onion cultivars grown in the village were N-53 type and soil was black cotton. District average purple blotch incidence was 44.08 percent.

The perusal of the results that the average purple blotch incidence with in the Osmanabad district was found to be maximum (60.00%). This may be due to N-53 type onion cultivars grown in medium black soil type. Further, the average purple blotch incidence was found to be minimum (36) percent which may be due to N-53 type onion cultivars grown in the black cotton soils. These observations are in conformity with the following. The survey was carried out for recording the incidence of *Alternaria* leaf blight of onion. It was observed the yield of onion seed was adversely affected culminating into a total loss. Purple blotch of onion seed crop induced by *A. porri* was the most serious disease prevalent all over the country (Gupta *et al.*, 1981) [3]. The purple blotch is

more in Rabi season (disease incidence 38 percent). It is one of the severe diseases of onion affecting both bulb and seed crop throughout India (Qadri *et al.*, (1982) ^[5]. Srivastava *et al.*, (1994) ^[9], studied the status of field diseases in onion in

India and reported that purple blotch (*A. porri*) incidence was high (2.5-87.8%) in both Kharif and Rabi seasons when high humidity prevailed, during the five years of the survey (1988-93).

Table 1a: Survey of purple blotch incidence in Latur district during Kharif-2013

Sr. No.	Tahsil	Purple blotch incidence (%)	Soil Type
Latur tahsil			
1	Kaneri	30.00	Black cotton
2	Vasangaon	40.00	Black cotton
3	Khadgaon	40.00	Black cotton
4	Gangapur	25.00	Medium black
5	Ramegaon	35.00	Medium black
6	Sakhara	35.00	Medium black
7	Chikurdi	25.00	Black cotton
8	Murud	45.00	Medium black
9	Khanapur	38.00	Black cotton
	Latur Av.	34.77%	-
Nilanga			
10	Panchincholi	50.00	Black cotton
11	Aured	36.00	Medium black
12	Kasarsirsi	40.00	Medium black
13	Nanandi	40.00	Medium black
14	Masalga	50.00	Black cotton
15	Nitur	30.00	Medium black
16	Toghri	32.00	Medium black
	Nilanga Av.	39.71%	-
Chakur			
17	Chakur	30.00	Light black
18	Latur road	32.00	Light black
19	Allagarwadi	30.00	Light black
20	Nalegaon	30.00	Medium black
21	Gharni	22.00	Medium black
	Chakur Av.	28.08%	-
Renapur			
22	Kharola	36.00	Black cotton
23	Pangaon	34.00	Black cotton
24	Renapur	40.00	Black cotton
	Renapur Av.	36.66%	-
	Mean (%)	35.20(%)	-

Table 1b: Survey of purple blotch incidence in Osmanabad district during Kharif 2013

Sr. No.	Tahsil	Purple blotch incidence (%)	Soil Type
Osmanabad Tahsil			
1	Palsap	45.00	Black cotton
2	Ter	42.00	Black cotton
3	Kingalwadi	44.00	Black cotton
4	Kini	45.00	Black cotton
5	Upala	50.00	Black cotton
6	Dhoki	36.00	Black cotton
7	Dhorale	38.00	Medium black
8	Yedsi	36.00	Black cotton
9	Kajale	35.00	Black cotton
10	Kond	39.00	Black cotton
11	Wanewadi	46.00	Black cotton
12	Patoda	40.00	Medium black
13	Karajkhede	42.00	Medium black
	Osmanabad Av.	41.38%	-
Tuljapur			
14	Mangrul	55.00	Black cotton
15	Apsinge	56.00	Medium black
16	Kati	58.00	Medium black cotton
17	Savargaon	60.00	Medium black
18	Kakaranb	58.00	Black cotton
	Tuljapur Av.	57.4%	-

Kallamb			-
19	Govindpur	38.00	Medium black
20	Vashi	52.00	Medium black
21	Kallan	40.00	Medium black
22	Chorakhali	40.00	Medium black
23	Yermala	42.00	Medium black
24	Indapur	45.00	Medium black
	Kallamb Av.	42.83%	-
	Mean (%)	44.08%	-



Fig 1: Typical symptoms of the disease

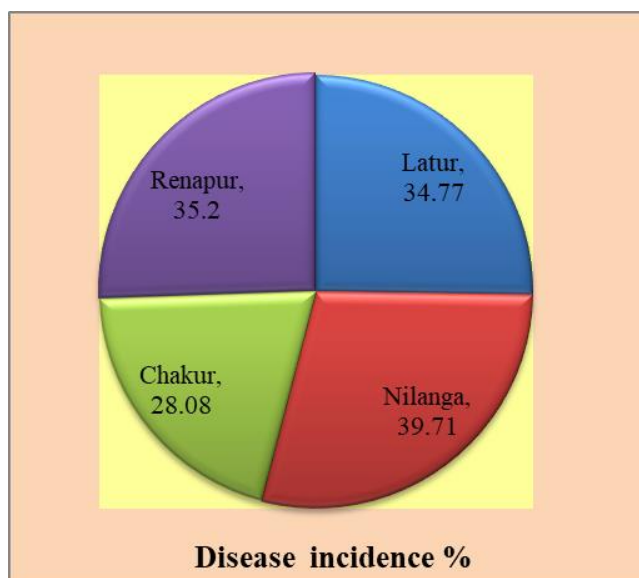


Fig 2: Purple blotch incidence on onion in Latur districts

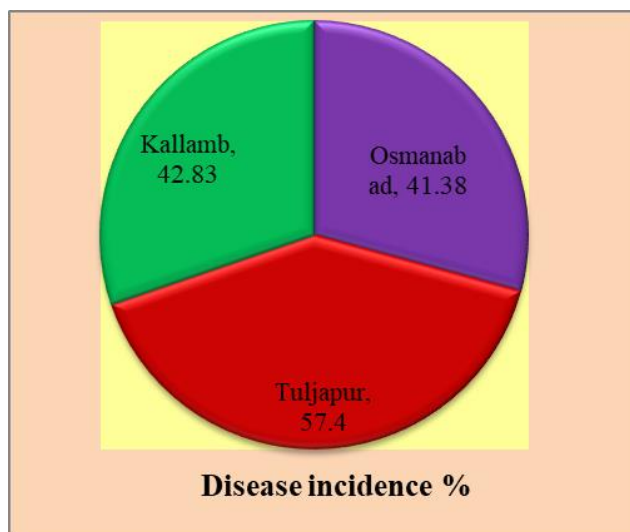


Fig 3: Purple blotch incidence on onion in Osmanabad district

Conclusion

The authors came to the conclusion that the onion, *Allium cepa* L., was responsible for roughly 80% to 90% of the losses. In Latur and Osmanabad district in the Marathwada region, the *Kharif* season encourages the disease and also causes economic losses, according to a survey. There were differences in disease incidence according to crop stage and variety, but there were no appreciable variations in cultivation techniques. The majority of the onion cultivars planted in the town were N-53 type of soil, which was black cotton, with the greatest average incidence being observed. Therefore, it is necessary to change the sowing dates and to research the various types of soil and their relationship to purple onion blotch disease.

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