Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(1): 1295-1297
Received: 19-11-2018
Accepted: 24-12-2018

Shikha Sharma
Department of Plant Pathology, Rajasthan Agricultural University, MPUAT, Udaipur, Rajasthan, India

RS Ratnoo
Department of Plant Pathology, Rajasthan Agricultural University, MPUAT, Udaipur, Rajasthan, India

Correspondence
Shikha Sharma
Department of Plant Pathology, Rajasthan Agricultural University, MPUAT, Udaipur, Rajasthan, India

Study on effect of host age and Host rang of *Alternaria porri*

Shikha Sharma and RS Ratnoo

Abstract
Alternaria blight is the most serious and devastating diseases of niger caused by *Alternaria porri* (Ell.). The genus *Alternaria* Nees ex Fr. is widely distributed in all over the world and is represented by number of species. The genus occupies a prime position and is significantly important as its members are well known in causing wide spread diseases of economic plants such as cereals, oil crops, spices, vegetables and ornamentals Niger crop was found to be more susceptible at 40-days. At this age, plants showed 38.31 per cent disease severity and 25 hrs of latent period as compared to 15-days-old plants which recorded the 10.74 per cent disease severity and 45 hrs of latent period. From the study of the host range of *A. porri* it was found that *A. porri* produced visible symptoms on all the tested crops. The symptom expression took longer time 12-14 days in Safflower and Sunflower, 10-12 days in chili and cotton, 9-10 days in clusterbean and 8-9 days in brinjal and tomato. Disease severity was also recorded on 1-5 scale and found that highest per cent disease index was recorded in onion (43.33 per cent) followed by garlic (36.51%) and minimum PDI was recorded in sunflower (26.44%).From the result it was concluded that *A. porri* have wide host range.

Keywords: *Alternaria porri*, host age and host rang

Introduction
Alternaria blight is the most serious and devastating diseases of niger caused by *Alternaria porri* (Ell.). Kolte (1985) [5]. The genus *Alternaria* Nees ex Fr. is widely distributed in all over the world and is represented by number of species. The genus occupies a prime position and is significantly important as its members are well known in causing wide spread diseases of economic plants such as cereals, oil crops, spices, vegetables and ornamentals. Pathogen may be host specific or may cause diseases on other host too. Host range of any pathogen is one criteria which shows its virulence and host preference. Diseases cause heavy damage upto 35-40 per cent to this crop and reduce its seed yields upto 25-30 per cent, which harm the status of the farmers. The disease appears as concentric rings on the leaves, which later on turns brown with grey centre. As the disease advances, the spots become oval or circular and become irregular in shape. The infected leaves become dry and fall off prematurely. The pathogen also spreads to other plant parts like stem, bud, seeds and results in to complete drying of the whole plant. The disease is favoured by warm and humid climate. Host range of any pathogen is one criteria which shows its virulence and host preference.

Material and Methods
To study the host range of the pathogen under pot condition
To investigate the host range of *A. porri* other than Niger, some of the cultivated plants were raised in earthen pots in cage house. The surface sterilized seeds of given crops were sown in sand: soil: FYM (3:1:1) mixture keeping a three replications in randomized block design (RBD) having 5 plants in each pot and suitable un-inoculated control pots were also maintained. Thirty days- old plant were inoculated with moderate inoculum density (1 x 10^3 conidia /ml) of *A. porri*. Blight severity on 1-5 Scale number of plants in each score, 7 days after inoculation and then weekly intervals, was recorded starting from thirty days old plants till maturity.

Table 1: List of other crops to check the host range of *Alternaria porii*

S. No.	Host Plants	Scientific Name
1	Garlic	*Allium sativum*
2	Onion	*Allium cepa*
3	Safflower	*Carthemus tinctorius*
4	Sunflower	*Helianthus annuus*
5	Clusterbean	*Cyamopsis tetragonoloba*
6	Chilli	*Capsicum annum*
7	Cotton	*Gossypium hirsutum*
8	Brinjal	*Solanum melongena*
9	Tomato	*Lycopersicon esculentum*

To study the factors affecting disease development

Effect of age of the host on disease development

A pot experiment was laid out in completely randomized design with five replications. Five seeds per pot were grown on earthen sterilized pots and at the age of 15, 21, 30 and 40 days old, plants with 1 $\times 10^3$ conidia /ml *of A. porri* by spray inoculation technique were inoculated on susceptible local land race. Inoculated plants were kept in humid chamber for 20 hours and then transferred to cage house and high humidity was maintained through out the disease development period by regular spraying of water. Observations for latent period after 12 hrs onwards and disease severity on 1-5 scale was recorded.

The pathogen was artificially inoculated on different plant species for their sensitivity to *A. porri* to know the host range of various plant species tested *viz.*, garlic *(Allium sativum)*, onion *(Allium cepa)*, safflower *(Carthemus tinctorius)*, sunflower *(Helianthus annuus)*, clusterbean *(Cyamopsis tetragonoloba)*, cotton *(Gossypium hirsutum)*, brinjal, (*Solanum melongena)*, chilli (*Capsicum annum)* and tomato (*Lycopersicon esculentum*) belonging to different families. The inoculated plants were kept under observation up to 30 days for any symptoms development as per description in material and methods. The result presented in Table 7, and Plate 7 revealed that *Alternaria* blight of niger pathogen produced visible symptoms on all the tested crops. The symptom expression took longer time 12-14 days in safflower and sunflower, 10-12 days in chilli and cotton, 9-10 days in clusterbean and 8-9 days in brinjal and tomato. Disease severity was recorded on 1-5 scale and found that highest per cent disease index was recorded in onion (43.33 per cent) followed by garlic (36.51 per cent), tomato (36.37 per cent) which was followed by brinjal (36.14 per cent). However, in cotton PDI was 32.65 per cent, followed by clusterbean (31.96 per cent). Whereas, PDI in safflower was 27.44 per cent, followed by chilli (26.48 per cent) and minimum PDI was recorded in sunflower (26.44 per cent).The pathogen was re-isolated from tested plant leaves and the morphological characters of the reisolated pathogen were compared with the original culture and these were similar in all respects. Hence, *Alternaria* leaf blight of niger (*A. porri*) has wide host range. However, *A. porri* has been reported from many other plant species too (Table 1)

Factors affecting disease development

Effect of host age

The effect of plant age on the development of Alternaria blight in pot grown Niger cultivar IGP-76, was evaluated at *viz.*, 15, 20, 30 and 40 days old plants using spray suspension of *A. porri* 1×10^3 conidia ml^{-1}. The observation for latent period after 12 hours and disease severity (1-5 disease rating scale) were recorded after 15 days of inoculation. The most susceptible age of Niger crop was found to be 40-days. At this age, plants showed 38.31 per cent disease severity and 25 hrs of latent period. Inoculation of 15-days-old plants resulted in 10.74 per cent disease severity and 45 hrs of latent period, followed by 21 days crop (18.33 per cent PDI) and latent period (35 hrs). Whereas, at 30-days of crop age plants showed 28.31 per cent disease severity and latent period of 30 hrs. All the treatment dates are statistically significant to each other. The susceptibility of Niger crop plants to Alternaria blight directly correlated with crop age and latent period is inversely proportional to crop age (Table-2).

Disease severity was also recorded on 1-5 scale and found that highest per cent disease index was recorded in onion (43.33 per cent) followed by garlic (36.51 per cent) then tomato (36.37 per cent) which is followed by brinjal (36.14 per cent).However, in cotton PDI was 32.65 per cent, followed by clusterbean (31.96 per cent). Whereas, PDI in safflower was 27.44 per cent, followed by chilli (26.48 per cent) and minimum PDI was recorded in sunflower (26.44 per cent). Similarly, Green *et al.*, 2001 [2] reported host range of *A. cirsionaxia* against asteraceae family. Our results are also supported by Agarwal (1985) [1]; Rotem (1994) [8] and Mangala *et al*. (2006) [9] as they also reported the host range of *A. alternata* in many other species from the solanaceae, brassicaceae and cucurbitaceae family.

Host age is the important factor for the susceptibility of the crop. The result revealed most susceptible age of niger crop was to be 40-days. At this age, plants showed 38.31 per cent disease severity and 25 hrs of latent period. Inoculation of 15-days-old plants resulted in 10.74 per cent disease severity and 45 hrs of latent period, followed by 21 days crop (18.33% PDI) and latent period (35 hrs). Whereas, at 30-days of crop age plants showed 28.31 per cent disease severity and latent period of 30 hrs. All the treatment dates are statistically significant to each other. Our results are also supported with the findings of Kong *et al.* (1995) [4] work on the susceptibility of host age with Alternaria Blight of sunflower. Suheri and Prince (2001) [10]; Kareem *et al*. (2012) [3] and Kumar and Kumar (2013) [7] also reported the work on the effect of host age on susceptibility to purple blotch of onion and alternaria blight of garlic respectively.

Table 2: Host range of *A porri* under inoculated condition in pots

S. No	Host	Scientific Name	Reaction	Incubation Period (Days)	Disease severity (%)*
1	Garlic	*Allium sativum*	+	7-9	36.51 (36.95)
2	Onion	*Allium cepa*	+	7-9	43.33 (41.17)
3	Safflower	*Carthemus tinctorius*	+	12-14	27.44 (37.17)
4	Sunflower	*Helianthus annuus*	+	12-14	26.44 (34.85)
5	Clusterbean	*Cyamopsis tetragonoloba*	+	9-10	31.96 (34.41)
6	Cotton	*Gossypium hirsutum*	+	10-12	32.65 (37.08)
7	Brinjal	*Solanum melongena*	+	8-9	36.14 (30.94)
8	Chilli	*Capsicum annum*	+	10-12	26.48 (30.96)
9	Tomato	*Lycopersicon esculentum*	+	8-9	36.37 (31.58)
	SEm± CD(*P*=0.05) CV%				1.120 3.359 3.4

Table 3: Effect of host age on disease severity under inoculated conditions in pots

S. No	Host age (Days)	Disease Severity (%)*	Latent Period (hrs)
1	15	10.74 (21.20)	45
2	21	18.33 (22.74)	35
3	30	28.31 (18.65)	30
4	40	38.31 (20.61)	25
	SEm±	0.327	
	CD (*P*=0.05)	0.980	
	CV%	4.42	

References

1. Agarwal DK. New host records of *Alternaria* spp. from India. Indian Phytopath. 1985; 38(2):392-393.
2. Green S, Mortensen K, Bailey KL. Host range, temperature response, survival and overwintering of *Alternaria cirsinoxia*. Biological Control. 2001; 20:57-64.
3. Kareem MA, Murthy KVMK, Nadaf HA, Waseem MA. Effect of host age and inoculum concentration on disease severity of purple blotch of onion caused by *Alternaria porri*. International Journal of Plant Protection. 2012; 5(1):93-95.
4. Kong GA, Kochman JK, Brown JF. A greenhouse assay to screen sunflower for resistance to *Alternaria helianthi*. Annals of Applied Biology. 1995; 127:463-478.
5. Kolte SR. Niger seed diseases In: Diseases of Annual Edible Oilseed Crops. CRC Press, Inc. 1985; III:139.
6. Kumar V, Lukose C, Bagwan NB, Koradia VG, Padavi RD. Occurrence of Alternaria leaf blight of groundnut in Gujarat and reaction of some genotypes against the disease. Indian Phytopath. 2012; 65(1):25-30.
7. Kumar M, Bhadouria V, Singh K, Singh C, Yadav AK. Evaluation of fungicide efficacy for the management of Alternaria leaf spot disease on chili. Plant Pathology Journal. 2013; 12(1):32-35.
8. Rotem J. The Genus *Alternaia*: Biology, epidemiology and pathogenicity. APS Press, St. Paul, 1994, 326.
9. Mangala UN, Subbarao M, Ravindrababu R. Host range and resistance to *Alternaria alternata* leaf blight on chilli. Journal of Mycology and Plant Pathology. 2006; 36(1):84-85.
10. Suheri H, Price TV. Purple leaf blotch disease of *Allium* spp. in Australia. Acta Horticulture. 2001; 555:171-173.