



Research Article

EVALUATION OF TURMERIC ACCESSIONS FOR TOLERANCE TO FOLIAR DISEASES

MISHRA R.S.* AND PANDEY V.P.

Department of Medicinal and Aromatic Plant, N.D. University of Agriculture & Technology, Kumarganj, Faizabad, 224229, Uttar Pradesh, India

*Corresponding Author: Email - drsumanmishra@gmail.com

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Abstract: Turmeric is a sacred spices of India is seriously affected by foliar diseases caused by *Taphrina maculans* and *Colletotrichum capsici*. Although the diseases can be kept under check with repeated chemical sprays, but excessive use of fungicides pose a threat due to pollution and health hazards, which thereby attempt have been made to evaluate 15 accession of turmeric against foliar diseases. Among them NDH-128 have been found tolerant against *Colletotrichum* leaf spot (14.2 PDI) and *Taphrina* leaf blotch (25.6 PDI) diseases with good rhizome yield. However NDH-123 was tolerant against *Taphrina* leaf blotch and NDH-130 for *Colletotrichum* leaf spot. NDH-135 gave higher fresh rhizome yield (40.66 t/ha).

Keywords: Turmeric, Accession, Foliar Diseases, Yield

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Introduction

Turmeric (*Curcuma longa* L.) is one of the most important spice crops cultivated in India. It is a rhizomatous herbaceous perennial plant of the family Zingiberaceae. Turmeric is used in flavouring, dye making, drug preparation, cosmetics and medicine [1]. The annual production of turmeric in India is about 1062.5 thousand metric tonnes on an area of 199.0 thousand hectares. In Uttar Pradesh, the area covered under turmeric cultivation is 1828 ha with a production of 5149 MT tonnes [2]. This crop is highly prone to several fungal diseases [3,4]. The serious foliar diseases on turmeric reported in UP are leaf spot caused by *Colletotrichum capsici* (Syd.) Butler & Bisby and leaf blotch caused by *Taphrina maculans* Butler. Among them, leaf spot is the most important disease of turmeric resulting to losses of 25.83 to 62.12% fresh weight and 42.10 to 62.10% dry weight of rhizomes, respectively [5,6]. Keeping in view of economic importance of the crop and disease, efforts were made to evaluate various turmeric accessions for tolerance to foliar diseases.

Materials and Methods

Experiment was conducted at N.D. University of Agriculture & Technology, Kumarganj, Faizabad from 2014-2017 in sandy loam soil with leaf spot disease susceptible the variety NDH-1. The trial was laid out in randomized block design with 15 turmeric accession and three replications. Rhizomes were planted on raised beds of 3 x 1m size at a spacing of 30 x 20 cm in the first fortnight of June. The other normal agronomical practices were adopted to raise the crop as and when necessary. The observation on germination was recorded at 30 DAP, leaf spot intensity was recorded 105 DAP on 10 randomly selected plants in each replication. The disease rating was recorded by adopting 0-6 scale (Palarpawar and Ghurde, 1989), where 0= No infection (healthy plants), 1=0.1 to 10 % leaf area infected, 2=10.1 to 20 percent leaf area infected, 3=20.1 to 30 % leaf area infected, 4=30.1 to 40 percent leaf area infected, 5=40.1 to 50 %leaf area infected, 5= More than 50 % leaf area infected. The percent disease intensity (PDI) was calculated according to the formula suggested by Datar and Mayee (1981) [7]. The yield of turmeric (fresh rhizome) in each treatment was recorded after harvest. The data obtained in all the experiments were statistically analyzed.

Results and Discussion

Susceptibility of foliar diseases is variable among the accessions as usual characteristics of the turmeric plants. Accession NDH-123 was found tolerant against *Taphrina* leaf blotch with 25.17 percent disease intensity. NDH-128, NDH-124 and NDH-131 were found comparable with that of a NDH-123 recording 30.40-32.53 percent disease intensity of *Taphrina* leaf blotch. NDH-128 accession showed tolerant against *Colletotrichum* leaf spot (14.2 PDI) and *Taphrina* leaf blotch (25.60 PDI). Other accession NDH-130, NDH-123, NDH-129 and NDH-131 were also found better tolerant against *Colletotrichum* leaf spot with 25.9 -28.1 PDI. Rest of the accessions were considered as moderate susceptible to susceptible for both foliar diseases. In case of fresh rhizome yield, a considerable variation was existed among the accession because it is collected from different ecological situations. NDH-135 accession produced highest rhizome yield 40.66 t/ha followed by NDH-136 (37.11t/ha), NDH-134 (36.10 t/ha) and NDH-130 (35.55 t/ha).Wide variability existed among the accession were supported by earlier workers [8-10]. Yield of turmeric varies from place to place due to genetic variability and influence of environment [11]. It is concluded that cultivation of tolerant variety (NDH-128) will be beneficial not only for reducing the losses due to foliar diseases but also improved the quality and yield of turmeric.

Conclusion

NDH-128 accession was found tolerant against both foliar diseases which is a major limiting factor for cultivation of turmeric.

Application of research: NDH-128 will be useful for the farmers where foliar diseases occurring year to year and causing huge yield loss.

Research Category: Medicinal and Aromatic Plant

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Table-1 Average percent disease intensity (PDI) and yield of turmeric accessions (2014-2017)

SN	Accessions	Leaf spot	Leaf Blotch	Yield t/ha
		(PDI)	(PDI)	
1	NDH-122	43.7	32.53	23.49
2	NDH-123	27.4	25.17	26.36
3	NDH-124	32	30.4	23.7
4	NDH-126	48.4	40.8	24.77
5	NDH-127	33.3	34.53	25.99
6	NDH-128	14.2	25.6	31.03
7	NDH-129	28.1	33.5	29.76
8	NDH-130	25.9	33.8	35.55
9	NDH-131	28.1	36.07	23.44
10	NDH-132	31.8	31.3	27.05
11	NDH-133	34.8	38	28.71
12	NDH-134	34.8	34.04	36.1
13	NDH-135	32.5	31.7	40.66
14	NDH-136	34.8	37.72	37.11
15	NDH-1(Ch)	45.4	48.29	29.76
CD=0.05		9.34	11.43	11.01
CV %		18.67	19.8	2.22

***Principal Investigator or Chairperson of research: Dr V. P. Pandey**

University: N.D. University of Agriculture & Technology, Kumarganj, Faizabad,
224229, Uttar Pradesh, India

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Study area / Sample Collection: Department of Vegetable Science and Vegetable Farm

Cultivar / Variety / Breed name: Turmeric (*Curcuma longa* L.)

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

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