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First report of leaf spot caused by *Colletotrichum gloeosporioides* on Nannari (*Decalepis hamiltonii* Wight and Arn.)

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Abstract
Decalepis hamiltonii Wight & Arn is an endemic and endangered medicinal plant with monotypic, glabrous, climbing shrub belonging to the family Periplocaceae (Kostel.) Schltr (earlier under Asclepiadaceae). It is largely used in Ayurvedic system of medicine for curing the diseases like stomach disorders, gastric ulcers and for stimulating appetite. Leaf spot symptoms were observed on the leaves of Nannari plants in different areas of A.P. The symptoms initially appeared as minute, brown to deep brown, circular to oblong shape, as the disease progressed, these spots enlarged and changed to dark brown boarder with whitish or light brown centre and resulted in necrotic region. The fungus was cultured on potato dextrose agar medium and identified as *Colletotrichum gloeosporioides* based on cultural, morphological characteristics. To the best of our knowledge this is the first report of *C. gloeosporioides* on leaves of Nannari.

Keywords: *Decalepis*, medicinal plant, leaf spot, *Colletotrichum gloeosporioides*

Introduction
India has been considered a treasure house of valuable medicinal and aromatic plant species. Commercial cultivation of medicinal and aromatic plants increases to meet the demand of increasing population. But now-a-days the diseases have been noticed to reduce the yield of medicinal and aromatic plants tremendously. The area under Medicinal and Aromatic crops is 659 ha with a production of 780 MT in 2020-21, has been registered (3rd Advance Estimates) (http://agriculture.gov.in.)
Decalepis hamiltonii Wight & Arn is also known as Maredu Kommulu, Nannari Kommulu, Madina Kommulu, Barre Sugandhi and Maredu Gaddalu in the local language and swallow root in English. It grows largely in moist and dry deciduous forests of Karnataka (Hassar, Mysore, Bellary, Tumkur, Kolar), Tamil Nadu (Chengalpattu, Coimbatore, Dharmapuri, Nilgiris) and Andhra Pradesh (Kurnool, Chittoor, Nellore, Anantapur, Cuddapah districts) (Gamble and Fischer, 1957) [1] at an altitude 300 to 1200 m (The Wealth of India, 2003) [2]. There are a number of diseases reported to affect medicinal plants. *Colletotrichum gloeosporioides* is one of the serious fungal pathogens causing diseases in plants. No information is available with regard to diseases caused by *Colletotrichum* spp. on nannari in India. Therefore, the present study was carried out with objectives to describe this new leaf spot disease of Nannari and to isolate and identify the causal organism and confirm its pathogenicity on healthy plants.

Material and Methods
The investigation pertaining to the present study were carried out at Department of Plant Pathology in College of Horticulture, Dr. Y.S.R. Horticultural University, V.R. Gudem, Andhra Pradesh.

Collection of diseased samples
Leaves showing typical symptoms of reddish brown spots were collected from different areas of A.P. and details of isolate are as follows. Isolate Cg_V was collected from Instructional farm, Venkataramannagudem, remaining isolates Cg_S, Cg_R, Cg_M, Cg_B, and Cg_N were collected from Sathupalli, Rajampeta, Markapuram, Bestavaripeta and Nuzivid, respectively.

Table 1: Details of the samples collected from different areas of A.P. and their designation.

S. No.	Isolate name	Place of collection	Latitude and longitude coordinates
1.	CgV	Venkataramannagudem	16º48´52.2864”N 81º3135.6088” E
2.	CgS	Sattupalli	17º20´63.3825”N 80º83´74.3938”E
3.	CgR	Rajampeta	14º19´61.6489” N 79º15´19.7366”E
4.	CgM	Markapuram	15º76´45.7784” N 79º27´19.3566”E
5.	CgB	Bestavaripeta	15º54´95.8050” N 79º 10´27.6401”E
6.	CgN	Nuzividu	16.94´30.2068”N 80.78´04.5361”E

Isolation of the pathogen

Infected leaf samples of nannari were collected from six different areas and brought to the laboratory for isolation by standard tissue segment method. Microscopic examinations were carried out to check the presence of spores for tentative identification of associated pathogen(s) with the diseased symptoms. The leaves showing the typical disease symptoms were surface disinfested by swabbing with 70% ethanol for 2 min and small bits about 2.0 mm size was excised from diseased leaf tissue at the interfaces of healthy and necrotic areas and then dipped in sodium hypochloride (1.0%) solution for one minute for surface sterilization and washed twice in sterile distilled water. The surface sterilised leaf pieces were then aseptically plated on potato dextrose agar (PDA) media and incubated at 28 ± 1 °C for 7 days under 12 h light and dark conditions. Hyphal tips from the margin of each developing colony were subcultured on PDA.

Identification and purification of the pathogen

The isolated pathogen was identified from all infected leaf samples by comparing the available standard literature for establishing their identity (Ellis, 1971, Ellis, 1993 and Simmons, 2007) [6, 7, 8]. Visual cultural characters *viz*., colony colour, growth rate, colony morphology or type of growth, texture of margins were recorded right from the initiation of mycelial growth till the period of complete covering of mycelial growth in Petri plates. Micro-morpho taxonomic characters like shape and size (length and width) of conidia, septation of conidia, presence or absence of setae, oil globules were observed under fluorescent microscope.

The six isolates were purified by single spore method described by Hansen (1926) [9] and pure cultures were maintained on PDA medium through routine sub culturing at fortnightly interval.

Pathogenicity test

Pathogenicity test of all the six isolates were carried out on three month old seedlings of nannari grown in poly bags filled with sterile soil by artificial inoculation with the pathogen(s) spore suspension. The inoculum load was adjusted up to $1x10^6$ conidia/ ml using haemocytometer (Doullah *et al*., 2006) [3]. The seedlings were then covered with polythene having five to six holes in it to facilitate the passage of air. The control was maintained by spraying water. The poly bags were kept inside a glasshouse at 25 °C and 95% RH to promote infection and lesion expansion.

Results

The symptoms initially appeared as minute, brown to deep brown circular to oblong shape, as the disease progressed, these spots enlarged and changed to dark brown boarder with whitish or light brown necrotic centre. Subsequently the central portion of the necrotic region drops off leaving shot hole symptoms on the leaves.

Typical symptoms were produced on artificially inoculated leaves after five to seven days. The pathogen from the infected leaves was re-isolated and compared with the original pathogen. No symptoms were observed in control leaves. On the basis of symptoms, cultural and morphological characteristics, the pathogen was identified as *C. gloeosporioides*.

The colony texture of the isolates varied from fluffy to submissive with regular margins. Among the isolates, growth rate varied significantly with a range of 8.31-11.25 mm/day. Initially colour of the colony was observed to be white which turns to olivaceous green to dark grey on the front view and white to grey on the rear view. Some of the isolates produced orange coloured spores. Among the isolates, the conidial size varied from 12.86 to 15.55 µm in length, 3.97 to 5.25 µm in width. The conidia were oblong or cylindrical or slightly dumbbell, hyaline, aseptate with rounded ends containing one to two oil globules.

Table 2: Stage wise symptom development in leaf spot disease of nannari.

Stage 1	Appearance of reddish brown spots on the leaves
Stage 2	Enlargement of spots with brown boarder and light brown centers
Stage 3	Coalescence of the spots with blight symptoms
Stage 4	Necrosis of the diseased tissues
Stage 5	Shot hole formation by dropping of necrotic centers

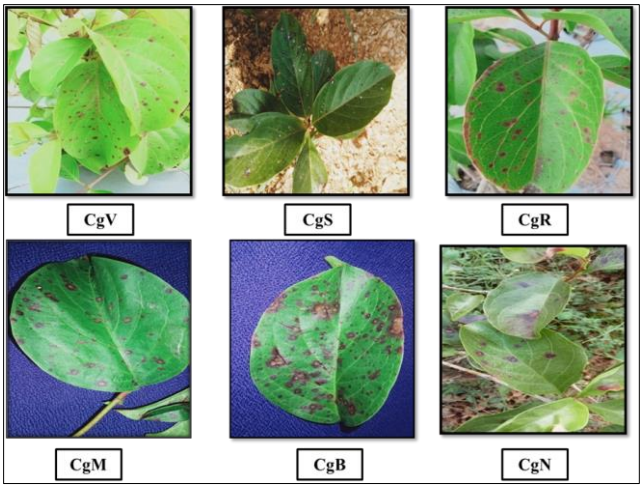

Fig 1: Leaf spot disease symptoms collected from six different area of A.P.

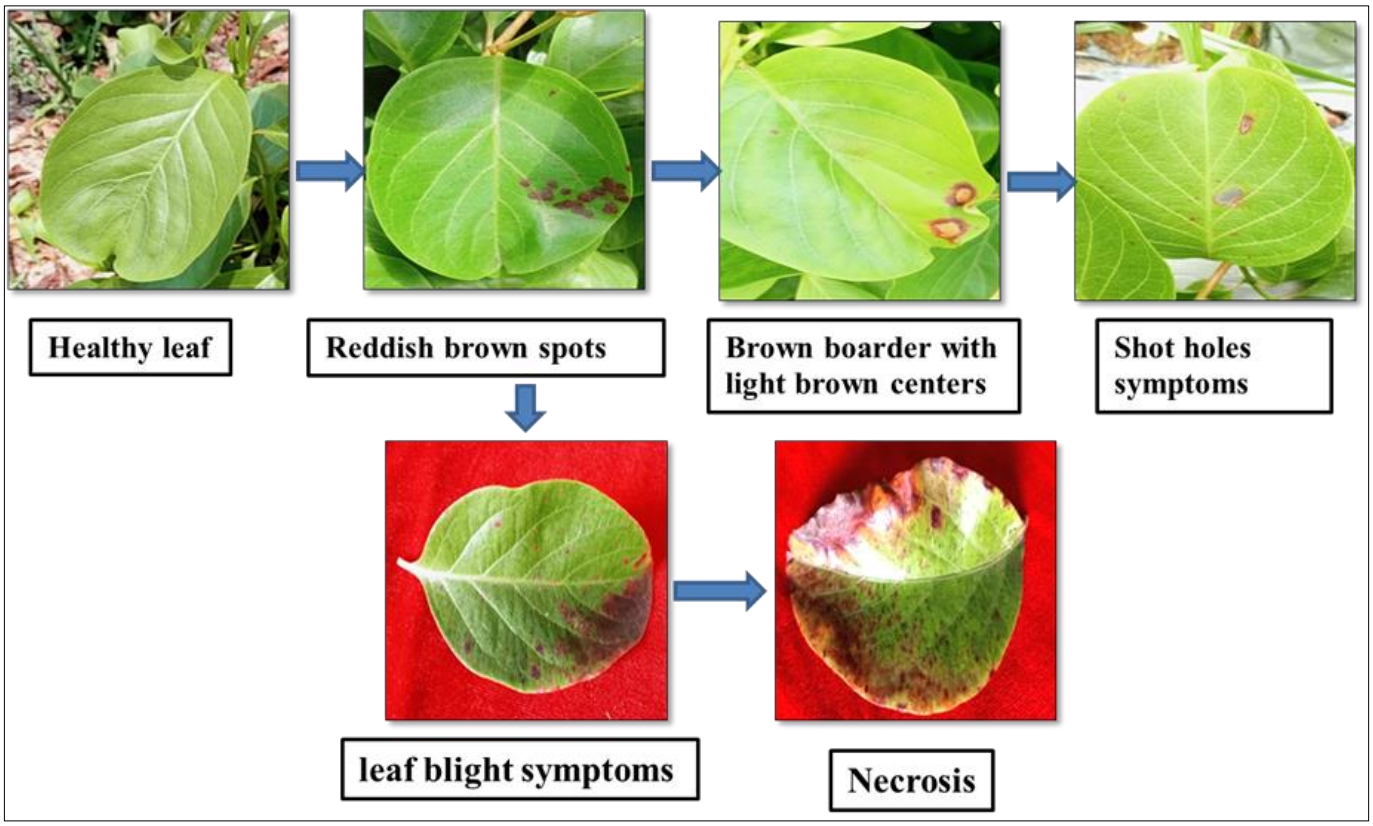

Fig 2: Stage wise symptom development in leaf spot disease of nannari

Discussion

A number of plant diseases caused by *C. gloeosporioides* has previously been reported. *C. gloeosporioides* causes anthracnose symptoms in some of the medicinal and aromatic plants *viz.*, Aloe vera (*Aloe barbadensis*), Aswagandha (*Withania somnifera*), Bach (*Acorus calamus*), Basak (*Adhatoda vasica*), Punarnba (*Boerhavia diffusa*), Safed Musli (*Chlorophytum borivilianum*), Sarpagandha (*Rauvolfia serpentina*) and Tulsi (*Ocimum sanctum*) (Mondal *et al*., 2018) [4].

Anthracnose of *Aloe vera* caused by *C. gloeosporioides* was reported by Avasthi *et al.* (2011) [5] and observed loss of mucilaginous gel in affected area which ultimately leads to death of infected leaves. According to the literature, this is the first report of leaf spot of nannari caused by *C. gloeosporioides* in India.

Conclusion

Isolation and identification of the collected isolates revealed that the causal organism of leaf spot in nannari is *Colletotrichum gloeosporioides*. Variation was also found among the collected six isolates with respect to cultural and morphological characteristics

References

1. Gamble JS, Fischer CEC. Flora of the Presidency of Madras, Adlard and Son Ltd., London. Nature. 1957;97(2):31-32.
2. The Wealth of India. A Dictionary of Indian Raw Materials and Industrial Products. CSIR, New Delhi. 2003;3:24.
3. Doullah MAU, Meah MB, Okazaki K. Development of an effective screening method for partial resistance to *Alternaria brassicicola* (dark leaf spot) in Brassica rapa. European Journal of Plant Pathology. 2006;116(1):33-43.
4. Mondal G, Dasgupta B, Sharma R. Diseases of medicinal and aromatic plants and their management. Recent Approaches for Management of Plant Diseases, 2018, 251-83.
5. Avasthi S, Gautam AK, Bhadauria R. First report of anthracnose disease of *Aloe vera* caused by Colletotrichum gloeosporioides. Research journal of biological sciences. 2011;6:408-10.
6. Ellis MB. Dematacеous Hyphomycetes. Commonwealth Mycological Institute, Kew, Surrey, England, 1971, 28-32.
7. Ellis MB. More Dematiaceous hyphomycetes. CAB International Wallingford.UK, 1993, 465-97.
8. Simmons EG. Alternaria: An Identification Manual, CBS Biodiversity Series No. 6, Utrecht, the Netherlands, 2007, 775.
9. Hansen HN. A simple method for obtaining single spore cultures. Science. 1926;64:384-89.