INHABITANTS OF ENDOPHYTIC *PHOMA*SPP.

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ABSTRACT

The fungal genus *Phoma* has been documented as exhibiting phytopathogenic properties, as well as functioning as saprophytes in soil. Additionally, this genus has been observed in various environments, including aquatic and aerial settings, marine environments, and as entomopathogens.The taxonomic classification *Phoma* pertains to pycnidia that bear single-celled, transparent conidia and are found on herbaceous stems. *Phoma* spp. had been classified with the class Coelomycetes because they have certain defining physical characteristics. Economically significant crop plants are frequently infected by fungi of the genus *Phoma*. Some *Phoma* species are host specific like *Phoma caloplacae* in *Triticumaestivum* and *Phoma multiristrata* have been found in weed plants *T. procumbens*. Some *Phoma* spp. found in more than plants like *Phomaherbarum, Phoma glomarata, Phoma enpyrena*habitats in evergreen tree, mangrove tree, perennial trees, Herbaceous and shrubs also. *Phoma* spp. have the potential to act as opportunistic pathogens for humans, animals, and plants Many unique and natural products with diverse biological activity have been traced back to *Phoma*, which has gained many prominences. *Phoma* spp. has been found to produce a variety of novel secondary metabolites that exhibit antimicrobial, anti-inflammatory, bio-herbicidal, antiangiogenic, cytotoxic, and anti-HIVactivity.

Keywords: Coelomycetes; Inhabitant**;** *Phoma* spp.; Pycnidia of *Phoma* spp.; Secondary metabolites.

INTRODUCTION

Phoma is a phylum Ascomycota member and a highly polyphyletic genus with ambiguous species boundaries. Due to these physical characteristics, *Phoma spp*. have traditionally been placed in the class Coelomycetes. Using morphological, more than 220 species were formally recognised in the handbook "Phoma Identification Manual" by Boerema et al. (Boerema et al., 2004). *Phoma spp*. was conceptualized in the 19th century by Italian mycologist Pier Andrea Saccardo 1880 (Kwong-Chung et al., 1992).

The genus *Phoma* fungi are known to undergo asexual reproduction, and their colonies are characterized by a velvety texture that may exhibit a slight powdery appearance, contingent upon the specific species. Pycnidia are characterized by the presence of pycn(idi)ospores or conidia, which are masses of spores consisting of a single cell. The culture characteristics and morphology are subject to variation due to various factors such as pH, temperature, and light, among others (Rajak et al, 1983). *Phoma* species can be distinguished from other dematiaceous fungus by their distinctive morphological characteristics, such as chlamydospores, conidia, and pycnidial conidiomata (fruiting structures that serve as a mechanism of disseminating conidia) (Rai et al., 2014).

Phoma spp. has been observed in various natural habitats, such as aquatic environments, water distribution systems, soil, and air, owing to the widespread prevalence of fungi (Bennett et al., 2018). Water system infiltration by *Phoma spp*. is widely known, and its presence is a public health concern (Babiˇc et al., 2017). *Phoma* species have the ability to transition from being opportunistic microorganisms to pathogenic agents upon encountering a suitable host.

Inhabitants-

Phoma spp. has been reported in multiple natural habitats due to the ubiquitous nature of fungi. The global distribution of Phoma spp. in food sources exhibits variability in its levels of exposure. Phoma spp has wide range of host plant and it inhabitate more than one type of host plant and some are document as host specific viz. *P. macrostoma* was observed to specifically inhibit dicot plants' growth (Bailey et al., 2013). *Phoma betae* is endophyte of Desert Plant, Flowering plant ,Herbaceous, perennial as well as in Endangered tree (Parismita et al. 2016). *Phomacaloplacae*, D. Hawksw. Found in *Triticum aestivum* . Some other *Phoma* spp have beenalso found in *Poacea* family crop like *Phoma glomerata*, (A.C.J. Corda) Wollenw. & Hochapfel (Crous et al. 1995).

Table 1 -Biodiversity of Endophytic *Phoma*

S. No.	Endophytic Phoma	Host flora	Family of the host flora	Type of the host flora	Reference
1	*Phoma Americana*	*Gramineae*	Poaceae	Grass	Boerema, 1993
		Gossypium hirsutum	Malvaceae	Cotton	Ek–Ramos et al., 2013
2	*Phoma bellidis*	*Eleocharis dulcis*	Cyperaceae	perennial herbaceous plant	Lv et al., 2011
		Ttricyrtis maculate	Liliaceae	Perennial herbaceous	Wang et al., 2019
3	*Phoma betae*	*Beta vulgaris*	Amaranthaceae	herbaceous biennial or, rarely, perennial plan	Garibaldi et al., 2007
		Ginkgo biloba	Ginkgoopsida	Endangered tree	Kumaran et al., 2012
		Kalidium foliatum (Pall.) Desert Plant from West China	Amaranthaceae	Desert Plant	Tan et al., 2018
		Artemisia nilagirica	Asteraceae	Herbaceous perennial, aromatic	Parismita et al., 2016
		Arabidopsis thaliana	Brassicaceae	Flowering Weed/ model plant for plant biology and genetics	Junker et al., 2012
4	*Phoma cava*	*Acer saccharum*	Sapindaceae	Sugar Maple flowering plant	Vujanovic & Brisson 2002
		Hancornia speciosa	Apocynaceae	Fruit tree	Chagas et al., 2017

		Quercus cerris	Fagaceae	Oak	Ragazzi et al., 1999; Moricca et al., 2012
5	*Phoma chenopodiicola*	*Celtis occidentalis*	Cannabaceae	Deciduous tree	Novas & Carmarán 2008
6	*Phoma chrysanthemicola, Hollós*	*Kigelia pinnata*	Bignoniaceae	Flowering tree	Maheswari & Rajagopal 2013
		Calotropis procera	Apocynaceae	Shrub	Khan et al., 2007
		Artemisia nilagirica	Asteraceae	Herbaceous perennial, aromatic	Parismita et al., 2016
		Avicennia marina Leaf	Acanthaceae	Mangrove	Bharathidasan & Panneersel vam 2011
7	*Phoma cucurbitacearum*	*Taraxacum coreanum*	Asteraceae	Perennial herbaceous	Paul et al., 2006
		Glycyrrhiza glabra Linn.	Fabaceae	Perennial herbaceous legume	Arora et al., 2016
8	*Phoma destructive*	*Gossypium spp.*	Malvaceae	Shrub flowering plant	Vieira et al., 2011
9	*Phoma draconis*	*Panax notoginseng*	Araliaceae	Medicinal Herb	Zheng et al., 2017
10	*Phoma epicoccinia*	*Phyllanthus amarus*	Phyllanthaceae	Tropical coastal herb	Kandasamy et al., 2015
11	*Phoma eupatorii*	*Eupatorium caunabinum*	Asteraceae	Herbaceous	De Vries et al., 2018

12	*Phoma eupyrena*	*Coffea arabica*	Rubiaceae	Shrub	Oliveira et al., 2014;
		Laguncularia racemosa	Combretaceae	Mangrove	Costa et al., 2012
		Gossypium spp.	Malvaceae	Shrub flowering plant	Vieira et al., 2011
		Clerodendron sp.	Lamiaceae sub family Ajugoideae	Tropical, warm temperate Shrub	Suryan et al., 2016
		Artemisia nilagirica	Asteraceae	Herbaceous perennial, aromatic	Myrchiang et al., 2014; Parismita et al., 2016
13	*Phoma exigua, Desmazières, J.B.H.J.*	*Calotropis gigantea L.*	Apocynaceae	Shrub	Selvanathan et al., 2011
		Coffea arabica L.	Rubiaceae	Shrub	Fernandes et al., 2009
		Ensete ventricosum	Musaceae	Evergreen Herbaceous	Chauhan et al., 2019
		Artemisia nilagirica	Asteraceae	Herbaceous perennial, aromatic	Parismita et al., 2016
		Ptychosperma macarthuri	Arecaceae	Palm	Song et al., 2015
		Quercus ilex L.	Fagaceae	Evergreen oak	Fisher et al., 1994
14	*Phoma fimeti, Brunaud*	*Vulpia ciliate spp. ambigua*	Poaceae subfamily Pooideae	Grass	Newsham, 1994
		Eucalyptus globules	Myrataceae	Evergreen tree	Simeto et al., 2005

15	*Phoma gardenia*	*Brugmansia aurea* Lagerh	Solanaceae	Sub-tropical shrub, ornamental	Singh et al., 2017
16	*Phoma glomerata, (A.C.J. Corda) Wollenw. & Hochapfel*	*Acer truncatum*	Sapindaceae	Deciduous tree	Sun et al., 2011
		Panicum virgatum L.	Poaceae	Perennial grass	Ghimire et al., 2011
		Vitis vinifera Grapes	Vitaceae	Liana	González & Tello 2011
		Sporobolus pyamidatus (Lam.) Hitchc	Poaceae	Annual grass	Loro et al., 2012
		Pappophorum krapovickasii Roseng.	Poaceae sub family Chloridoideae	Perennial grass	
		Cyperus laevigatus L.	Cyperaceae	Perennial sedge	
		Trachycarpus fortunei	Arecaceae	Palm	Taylor et al., 1999
		Cucumis sativus	Cucurbitaceae	Vegetable	Waqas et al., 2012
		Glycine max From leaves	Fabaceae Sub family Faboideae	Edible bean crop	Fernandes et al., 2015
		Triticum aestivum	Poaceae	Cereal crop	Crous et al., 1995
		Gossypium spp.	Malvaceae	Shrub flowering plant	Vieira et al., 2011
		Salvia miltiorrhiza	Lamiaceae	Deciduous perennial herb	Li et al., 2016

17	*Phoma hedericola*, (Durieu & J.P.F.C. Montagne) Boerema	*Avicennia marina* Leaf	Acanthaceae	Mangrove	Bharathidasan & Panneerselvam 2011
		Menthe viridis Stem	Lamiaceae	Perennial herb, medicinal, food supp.	Kumar et al., 2016
		Ricinus communis Linn. Leaf	Euphorbiaceae Sub family Acalyphoideae	Perenial flowering, suckering shrub	Sandhu et al., 2014
		Calotropis procera	Apocynaceae	Shrub	Juyal et al., 2017 and Khan et al., 2007
18	*Phoma herbarum*, G.D. Westendorp	*Rauwolfia serpentine*	Apocynaceae	Perennial shurb	Das & Chatterjee (2023).
		Holcus lanatus	Poaceae	Perennial grass	Márquez et al., 2010
		Pinus halepensis	Pinaceae	Cone Pinus tree	Botella & Diez 2011
		Olea europaea L.	Oleaceae	Evergreen small, tree	Materatski et al., 2019
		Laguncularia racemosa	Combretaceae	Mangrove	Costa et al., 2012
		Curcuma longa L.	Zingiberaceae	Perennial rhizomatous herbaceous	Gupta et al., 2016
		Taxus x media	Taxaceae	Conifer	Xiong et al., 2013
		Coffea arabica L.	Rubiaceae	Shrub	Fernandes

					et al., 2009
		Helianthemum guerrae	Cistaceae	Shrub	Macia-Vicente et al., 2008
		Piper hispidum Sw	Piperaceae	Perennial shrub	Orlandelli et al., 2012
		Salvia miltiorrhiza	Lamiaceae	Deciduous perennial herb	Chen et al., 2020
19	*Phoma jolyana*, Piroz. & Morgan-Jones	*Eucalyptus nitens*	Myrtaceae	Tall tree	Smith et al., 1996
		Forsythia giraldiana	Oleaceae	Deciduous shrub	Sun et al., 2008
		Azadirachta indica	Meliaceae	evergreen tree	Iqbal et al., 1984
20	*Phoma leonuri*, Letendre	*Phoradendron perrottettii*	Santalaceae		De Abreu et al., 2010
21	*Phoma leveillei*, Boerema & G.J. Bollen	*Arabidopsis thaliana*	Brassicaceae	Flowering Weed/ model plant for plant biology and genetics	Junker et al., 2012
		Rhizophora mucronata	Rhizophoraceae	Tropical Mangrove	Humzah et al., 2018
		Quercus ilex L.	Fagaceae	Evergreen oak	Fisher et al., 1994
		Cantharanthus roseus	Apocynaceae	Evergreen Sub-shrub or herb	Krishnamurthy et al., 2008
		Rauwolfia serpentine	Apocynaceae	Perennial shurb	
		Helianthemum guerrae	Cistaceae	Shrub	Macia-Vicente et al., 2008
		Ononis natrix	Fabaceae	Perennial shrubby	

		subsp. Ramosissima			
		Euphorbia sancte Catherine	Euphorbiaceae	Aromatic herb	Selim et al., 2018
22	*Phoma lingam*, (Tode) Desmazières, J.B.H.J.	*Eucalyptus globulus*	Myrtaceae	Evergreen, tall tree	Bettucci & Saravay 1993
		Pinus tabulaeformis Mountain	Pinaceae	Pinus	Guo et al., 2008
		Prosopis juliflora (S.W.) DC. Leaves	Fabaceae	Weed, Shrub or small tree	Srivastava and Anandrao, 2015
23	*Phoma macrostoma*, J.P.F.C. Montagne				
		Arabidopsis thaliana	Brassicaceae	Flowering Weed/ model plant for plant biology and genetics	García et al., 2013
		Olea europaea L. Leaves, oil tree Mediterranean	Oleaceae	Evergreen small, tree	Materatski et al., 2019
		Glycryrrhiza glabra Linn.	Fabaceae	Herb, perennial, legume	Nalli et al., 2019
24	*Phoma medicaginis,* Malbranche & Roumeguère	*Medicago sativa*	Fabaceae	Perennial flowering legume	Weber et al., 2004
		Medicago lupulina	Fabaceae Sub family Faboideae	Annual or shot-live perennial legume	
		Aquilaria sinensis China	Thymelaeaceae	Evergreen tree	Cui et al., 2011
		Panicum virgatum L.	Poaceae	Perennial grass	Ghimire et al., 2011
		Taxus globosa	Taxaceae	Evergreen Shrub	Rivera–Orduña et

					al., 2011
		Vitis vinifera Grapes	Vitaceae	Liana	Cosoveanu et al., 2014
		Mikania cordata	Asteraceae	Creeping, perennial	Jayatiake and Munasinghe, 2020
		Boswellia	Burseraceae	Moderate size tree and shrub	Khan et al., 2016
		Taxus wallichiana var. mairei	Taxaceae	Deciduous/ evergreen shrub	Zaiyou et al., 2017
25	*Phoma microchlamydospora*, Aveskamp & G.J.M. Verkley	*Terminalia mantaly*	Combretaceae	Evergreen small to medium tree	Toghueo et al., 2017
26	*Phoma moricola*, P.A. Saccardo	*Paspalum ligulare* Nees	Poaceae	Herb	Loro et al., 2012
		Eremophila longifolia Australia	Scrophulariaceae	Shrub or small flowering tree	Zaferanloo et al., 2018
		Solanum cernuum Vell.	Solanaceae	Shrub or small tree	Vieira et al., 2012
		Garcinia parvifolia	Clusiaceae	Tropical evergreen tree	Sim et al., 2010
		Echinacea purpurea (L.) Moench	Asteraceae	Perennial, herbaceous	Luiz et al., 2012
27	*Phoma multirostrata*, (P.N. Mathur,	*Trachycarpus fortunei* (Temperate palm)	Arecaceae	Palm	Taylor et al., 1999

	S.K. Menon & Thirum.) Dorenb. & Boerema	*Cantharanthus roseus*	Apocynaceae	Evergreen Sub-shrub or herb	Krishnamurthy et al., 2008
		Withinia somnifera	Solanaceae	Perennial shrub	
		Cassia tora	Fabaceae	Annual Herb	
		Securinega suffruticosa	Phyllanthaceae	Deciduous shrub	Du et al., 2020
		*Eupatorium adenophorum*Leaf	Asteraceae	Perennial, herb	Chen et al., 2015
		Centella asiatica Leaves, root, stolons	Apiaceae	Perennial, flowering herb	Radiastuti et al., 2019
		Cantharanthus roseus Leaves	Apocynaceae	Evergreen Sub-shrub or herb	Khiralla et al., 2016
28	*Phoma nebulosa*, (Persoon) Berkeley	*Cirsium arvense L.*	Asteraceae	Herb, perennial C3 carbon fixing plant	Schulz et al., 1998
		Mimusops elengi Leaf	Sapotaceae	Tropical evergreen tree	Kannan et al., 2017
		Trachycarpus fortunei	Arecaceae	Palm	Taylor et al., 1999
29	*Phoma pinodella*, (L.K. Jones) Morgan-Jones & K.B. Burch	*Hevea brasiliensis* Rubber plant	Euphorbiaceae	Deciduous tree	Gazis & Chaverri 2010
		Trachycarpus fortunei	Arecaceae	Palm	Taylor et al., 1999
30	*Phoma pomorum*, Thümen, F. von.	*Glycine max*	Fabaceae Sub family Faboideae	Edible bean crop	Fernandes et al., 2015
		Salsola collina	Chenopodiaceae	Desert weed plant	Sun et al., 2012
		Suaeda salsa	Amaranthace	Annual herb	

			ae		
		Trachycarpus fortunei	Arecaceae	Palm	Taylor et al., 1999
		Citrus limon	Rutaceae	Small evergreen plant	Douanla-Meli et al., 2013
31	*Phoma putaminum*, C. Spegazzini	*Dendrobium crumenatum*	Orchidaceae Subfamily - Epidendroideae	Pigeon orchid, large but short-lived, strongly scented white flowers	Maciá–Vicente et al., 2008
		Bauhinia forticata	Fabaceae	Brazilian orchid tree, flowering tree in the pea family	Bezerra et al., 2015
		Dysosma versipellis	Berberidaceae	flowering barberry plant	Tan et al., 2018
32	*Phoma radicina*, (McAlpine) Boerema	*Panax ginseng Meyer*	Araliaceae	Medicinal Herb	Park et al., 2012
		Panax notoginseng	Araliaceae	Medicinal Herb	Zheng et al., 2017
		Salvia abrotanoides	Lamiaceae	Russian sage, flowering herb	Teimoori-Boghsani et al., 2020
		Armoracia rusticana	Brassicaceae	Perennial flowering plant	Szűcs et al., 2018
33	*Phoma selaginellicola*, Gruyter, Noordeloos, Aa & Boerema	*Dysosma versipellis* Root	Berberidaceae	Flowering barberry plant	Tan et al., 2018b
		Acer negundo L. Root	Sapindaceae	Fast-growing, short-lived tree with opposite, compound leaves	Bukharina et al., 2018

		Thymus eriocalyx	Lamiaceae	Flowering herb	Masumi et al., 2014
34	*Phoma solani*, Cooke & Harkn.	*Boswellia sacra*	Burseraceae	Small deciduous tree	El–Nagerabi et al., 2014
35	*Phoma sorghina*, (P.A. Saccardo) Boerema, Dorenb. & Kesteren	*Chloris inflate* (=C. barbata Sw.)	Poaceae	Monocot weed	Loro et al., 2012
		Ziziphus spina-christi	Rhamnaceae	Evergreen tree, arid and semi-arid	El–Nagerabi et al., 2013
		Brachiaria	Poaceae	Grass	Gama et al., 2019
		Musa spp Leaves	Musaceae	Largest herbaceous plants	Zakaria and Aziz 2018
36	*Phoma terrestris*, H.N. Hansen (Present Name : *Setophoma terrestris*)	*Mimosops elengi*	Sapotaceae	Evergreen tree, tropical forests	Deshmukh et al., 2009
		Panax ginseng Meyer	Araliaceae	Perennial, medicinal plant	Park et al., 2015
		Brassica oleracea var. acephala	Brassicaceae	Food crop plant	Poveda et al., 2020
37	*Phoma tropica*, R. Schneid. & Boerema	*Opuntia ficus-indica Mill.*	Cactaceae	Cactus arid and semiarid	Bezzera et al., 2012
		Fucus spiralis seaweed, a brown Algae	Fucaceae	Seaweed, a brown Algae	Osterhage et al., 2002
38	Phoma sp.	*Calotropis procera*	Apocynaceae	Shrub	Khan et al.,

					2007
39	Phoma sp.	*Tinospora cardifolia*	Menispermaceae	Herbaceous vine	Kedar et al., 2014
40	Phoma sp.	*Calotropis procera*	Apocynaceae	Flowering plant	Kedar et al., 2014
41	Phoma sp.	*Taxus wallichinia,*	Taxaceae	Evergreen coniferous tree	Yang et al., 1994
42	Phoma sp.	*Larrea tridentate* Desert	Zygophyllaceae	Flowering plant	Strobel et al., 2011
43	Phoma sp. NRRL 46751	*Saurauia scaberrinae*	Actinidiaceae	Flowering plant	Wijeratne et al., (2013)
44	Phoma sp. EL002650	*Artemisia princeps Pamp*	Asteraceae	Perennial	Kim et al., 2018
45	Phoma sp. YUD17001	*Gastrodia elata*	Orchidaceae	Perennial herb	Li et al., 2020
46	Phoma sp. ZJWCF006	*Arisaema erubescenes*	Araceae	Flowering plant	Wang et al., 2012
47	Phoma sp.	*Artemisia thuscula*	Asteraceae	Evergreen shrub	Cosoveanu et al., 2018
48	Phoma sp.	*Sapindus saponaria* L.	Sapindaceae Ranunculaceae	Small to medium-sized deciduous tree	Garcia et al., 2012
49	Phoma sp.	*Aconitum vilmorinianum*	Ranunculaceae	Herbaceous perennials or biennials	Liu et al., 2019
50	Phoma sp.	*Artemisia annua*	Asteraceae	Annual short-day plant	Wati et al., 2019
51	Phoma sp.	*Rhizophora mucronata*	Rhizophoraceae	Small to medium size evergreen tree	Hamzah et al., 2018
52	Phoma sp.	*Facus serratus*	Fucaceae	Robust alga	Hussain et al., 2014

53	Phoma sp.	*Luehea divaricata*	Malvaceae	Medicinal plant	Alberto et al., 2016
		Sapindus saponaria	Sapindaceae	Small to medium-sized deciduous tree	
54	Phoma sp. LK13	*Moringa peregrine*	Moringaceae	Flowering plant	Khan et al., 2014
55	Phoma sp.	*Rhododendrons*	Ericaceae	Either evergreen or deciduousshrubs	Purmale et al., 2012
56	Phoma sp. PT01	*Mitrajyna javanica Koord and val*	Rubiaceae		Pharamat et al., 2013
57	Phoma sp.	*Calotropis gigantean*	Apocynaceae	Waxy flowers shrubs	Hemamalini et al., 2015
58	Phoma sp.	*Fiscus infectoria*	Moraceae	*Semi-evergreen tree*	Rajagopal et al., 2008
		Fiscus microcarpa (Tropical forest western ghats)	Moraceae	Tropical ornamental tree	
59	Phoma sp.	*Musa acuminata,* (North queensland)	Musaceae	Evergreen perennial, not a tree	Brown et al., 1998
60	Phoma sp.	*Rhapis humulis*	Arecaceae	Evergreen shrub	Jiaojiaoet al., 2016
		Wodyetia bifurcate	Arecaceae	Small or medium-sized, solitary palm	
		Chrysalidocarpus lotenscens	Arecaceae	Flowering plant	
		Veitchia merrillii	Arecaceae	Tropical palm tree	
		Phoenix roebelenii	Arecaceae	Slow-growing slender tree	
61	Phoma sp. EA-122	*Eupatoriumadenophorum*	Asteraceae	Subtropical and warmer temperate	Chen et al., 2015
62	Phoma sp.	*Hyparrhenia hirta*	Poaceae	Tenacious noxious weed	White and Backhouse., 2007
		Bottriochloa macra	Poaceae	Perennial grass	White and

					Backhouse. , 2007
63	Phoma sp. SYSU-SK-7	*Kandelia candel*	Rhizophoraceae	Shrub or small tree up to 10 metres (Mangroove)	Chen et al., 2019
64	Phoma sp.	*Triticum aestivum Leaf*	Poaceae	Edible Crop	Larran et al., 2002

Endophytes plays a significant role in drug discovery because the interaction between host plants and endophytes enhances the possibility of finding new natural products (Szűcs et al., 2018). According to this review phoma species produces some metabolites such as Polyketide, Taxol/Spiciferon 1-7, Thiodiketopiperazine , Salvianolic Acid C, Gentisyl alcohol/Tanshinone, Macrophin, Brefeldin A/Glucosidases/Paclitaxel, amylase/cellulose/lipase, Cytochalasins, Cryptotanshinone/ Glucosinolate/isothiocyanate, Amylase, Ergoflavin, 5-hydroxyramulosin7-methoxycoumarin, Alkaloids, Isochromanone derivatives, Phenolic compounds/aliphatic easter derivatives/ fatty acids, Polyketides, 14-nordrimane produced by *Phoma bellidis, Phoma betae*,*Phoma cucurbitacearum, Phoma glomerata, Phoma herbarum, Phoma macrostoma, Phoma medicaginis, Phoma microchlamydospora*, *Phoma multirostrata*, *Phoma radicina*, *Phoma selaginellicola, Phoma terrestris, Phoma tropica*, *Phoma sp*. NRRL 46751, *Phoma sp*. EL002650*, Phoma sp.* YUD17001, *Phoma sp*. SYSU-SK-7, *Phoma sp* respectively. These metabolites have antimicrobial, antiviral, antifungal, antibacterial, cytotoxic, anti-cancer, anti-proliferative, antitubercular activity, which have been proved by various studies.

CONCLUSION

The taxonomic classification of *Phoma* spp. is still a subject of controversy within academic circles, with both morphological and molecular data being utilised in attempts to resolve the issue. The taxonomic classification of the *Phoma* genus remains a subject of controversy despite the utilisation of both molecular and morphological data. There have been reports of perplexing and intersecting characters observed among various *Phoma* species belonging to identical sections. Several studies have been conducted regarding the cultural and morphological characterization of *Phoma* species in India. However, no comprehensive research has been conducted on the development of identification keys for a particular taxonomic group.

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