

**EFFECT OF METABOLITES OF MYROTHECIUM
LEUCOTRICHUM ON THE GERMINATION OF
SPORES OF PLANT PATHOGENIC FUNGI**

SPECIES of *Myrothecium* are considered as soil-borne fungi. *M. roridum* causes leaf spots and diebacks on a number of hosts in temperate and tropical regions¹. The biologically active trichothecene substances produced by these species include myrothecin, verrucaric acid, roridin, diacetyl verrucarol and necrocitin²⁻⁴.

M. leucotrichum (Pk.) Tulloch is mildly parasitic on sorghum and legumes. In this study we report the effects of *M. leucotrichum* culture filtrate *in vitro*, on the germination of spores of plant pathogenic fungi.

M. leucotrichum was grown in liquid culture⁵ at pH 6.5. The culture filtrate (CF) of 21 day old static cultures was used with culture medium as control. The culture filtrate was diluted with sterile distilled water and tested on fungi⁶. Sterilised culture filtrate (SCF) was also used to know the effect of heating.

The culture filtrate caused significant inhibition of germination in *Asperisporium caricae*, *Cercospora solani-melongena*, *Cladosporium fulvum*, *Gloeocercospora sorghi* and *Gloeosporium* spp. (Table I). The

inhibition decreased with dilution except in *Melanospora lagenaria*. Culture filtrate as such was toxic to the fungi. However, higher dilutions stimulated the germ tubes in *Alternaria tenuis*, *Fusarium oxysporum* and *Gloeocercospora sorghi*. Germ tube development in *Alternaria tenuis*, *Asperisporium caricae*, *Cercospora solani-melongena* and *Cladosporium fulvum* was reduced by the toxins. But in *Gloeocercospora sorghi* and *Melanospora lagenaria* the effect was stimulatory. The toxins inhibited branching, in *Cercospora solani-melongena* and reduced their number in *Alternaria tenuis*. But in *Cylindrosporium koenigii*, *Fusarium oxysporum*, *Gloeocercospora sorghi*, *Gloeosporium* spp. and *Melanospora lagenaria* the treatment lead to the initiation of branches. Sterilisation relieved the inhibitory effect of culture filtrate partially.

The toxic metabolites from the culture filtrates of *Fusarium moniliforme*, *Aspergillus flavus* and *A. terreus*, also suppress the growth of *Aspergillus niger*⁶. Cercosporin (*Cercospora betae* toxin) inhibits the activity of *Fusarium culmorum*, *Curvularia lunata*, *Botrytis cinerea* and *Cercospora ricinella*⁷. The metabolites of *Aspergillus flavus* and *A. niger* reduce the mycoflora of seeds of different varieties of mustard⁸. *M. leucotrichum*

TABLE I

Effect of Culture Filtrate of Myrothecium leucotrichum on Plant Pathogenic Fungi
(Values for 10⁶ spores)

1	CONT.	SCF	CF	CF	CF	CF	CF	CF
	2	3	4	10	50	100	500	1000
1	2	3	4	5	6	7	8	9
1. <i>Alternaria tenuis</i> Nees								
% germination	98	91	51	82	92	93	92	92
Length of germ tube (μ)	185	99	75	153	169	184	164	149
Total No. of germ tubes	174	162	147	167	168	317	148	145
Total No. of branches	28	3	2	8	10	11	4	2
2. <i>Asperisporium caricae</i> (Speg.) Maubl.								
% germination	75	8	5	7	12	13	62	47
Length of germ tube (μ)	14	7	7	7	10	11	17	15
Total No. of germ tubes	136	104	100	100	118	119	125	103
Total No. of branches	..	..	..	..	..	..	..	..
3. <i>Cercospora solani-melongena</i> Chupp.								
% germination	93	5	1	3	72	79	80	81
Length of germ tube (μ)	162	18	24	29	51	56	60	74
Total No. of germ tubes	188	114	100	129	136	138	142	130
Total No. of branches	5	..	..	..	..	..	..	..

TABLE I—Contd.

1	2	3	4	5	6	7	8	9
4. <i>Cladosporium fulvum</i> Cooke								
% germination	91	6	2	75	85	86	88	91
Length of germ tube (μ)	52	12	7	24	51	66	67	67
Total No. of germ tubes	126	112	100	143	145	161	165	147
Total No. of branches	..	..	..	..	..	..	..	..
5. <i>Cylindrosporium koenigii</i> Thirum.								
% germination	94	53	35	77	79	88	90	87
Length of germ tube (μ)	52	23	22	35	42	53	58	42
Total No. of germ tubes	199	165	123	171	187	189	192	183
Total No. of branches	3	1	..	2	4	5	9	4
6. <i>Drechslera sacchari</i> (Butl.) Subram. & Jain								
% germination	94	82	82	90	91	93	78	74
Length of germ tube (μ)	339	263	264	286	288	371	324	258
Total No. of germ tubes	175	181	190	171	169	161	141	136
Total No. of branches	118	171	52	85	95	138	140	191
7. <i>Fusarium oxysporum</i> Schlecht.								
% germination	98	97	64	94	95	96	98	98
Length of germ tube (μ)	199	89	34	100	115	134	148	143
Total No. of germ tubes	161	170	138	164	173	175	206	191
Total No. of branches	..	..	..	4	4	8	8	5
8. <i>Gloeocercospora sorghi</i> Bain & Edgerton								
% germination	95	46	7	81	85	87	89	90
Length of germ tube (μ)	270	48	24	174	215	303	334	337
Total No. of germ tubes	325	158	133	301	454	479	625	330
Total No. of branches	97	4	22	57	63	64	108	81
9. <i>Gloeosporium</i> spp. isolated from infected fruits of <i>Punica granatum</i>								
% germination	73	35	11	74	81	79	73	60
Length of germ tube (μ)	110	44	10	112	113	115	111	109
Total No. of germ tubes	100	100	100	100	100	100	100	100
Total No. of branches	..	1	4	21	31	18	16	16
10. <i>Melanospora lagenaria</i> (Persoon) Fuckel								
% germination	42	30	27	28	11	9	7	2
Length of germ tube (μ)	117	65	42	154	180	269	363	206
Total No. of germ tubes	200	196	120	176	184	195	195	200
Total No. of branches	..	..	..	2	3	5	16	2

could be added to this list of organisms which produce potential antifungal compounds.

The stimulatory effect on the germ tube length and number of branches noticed in a few is presumably due to the nutrients produced by the fungus. The metabolites of *Fusarium culmorum*, *Aspergillus niger*, *Alternaria humicola*, *Fusarium poae* and *Cladosporium herbarum* influence the growth of *Aspergillus niger*⁶. The nutrients are aminoacids, growth hormones and vitamins.

Inhibition of germination, number of germ tubes and appresoria of fungi by *M. leucotrichum* may lead to successful control of these pathogens.

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A NEW NAME FOR AN INDIAN GRASS

THE authors have been engaged on a taxonomic revision of the Indian species of *Agrostis* Linn. and *Polypogon* Desf. These two genera are distinguished chiefly by the disarticulation of spikelets below the glumes in *Polypogon* Desf. and above the glumes (i.e., glumes persistent) in *Agrostis* Linn.; and glumes being usually awned in *Polypogon* Desf. and acute or acuminate in *Agrostis* Linn.

Agrostis subaristata Aitch. et Hemsley was found to possess awned glumes, a character not seen in any other Indian species of *Agrostis* Linn. This led to a closer study of all material of this species, and more literature on these two genera.

It was seen that the presence of awn on the glume of certain species in *Agrostis* Linn. caught the attention of Beetle¹, about thirty years ago. He discussed the morphology and affinities of six taxa, and due to the persistent glumes and certain other characters, retained them in *Agrostis* Linn., but, created a separate Section Microphyllae to accommodate them. Material of one of these species, namely, *A. inflata* Beal was available to us and was examined.

A. subaristata Aitch. et Hemsley, however, in addition to having awned glumes, has the most significant character of *Polypogon* Desf. namely, disarticulation below the glumes and also some other minor characters which are listed as below:

1. Panicle more or less contracted.
2. Glumes dorsally scabrid.
3. Lemma truncate, awned, awn sub-terminal, straight and deciduous; nerves of lemma extended.
4. Palea about two-third the lemma in length, tip lacerate.

In view of this, the authors consider it appropriate to transfer this species to *Polypogon* Desf. and name it—*Polypogon subaristatus* (Aitch. et Hemsley) Sunanda Bhattacharya et Jain comb. nov.

Basionym: *Agrostis subaristata* Aitch. et Hemsley in *Jour. Linn. Society (Bot.)*, 19: 192. t. 29. 1881.
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REPORT ON ROOT NODULE FORMATION IN *EUPATORIUM* SPP.

THE symbiotic association between the bacteria and leguminous plants in the root nodule is well known. There are, however, a few genera of nonleguminous angiosperms which also show root nodulation. In nonleguminous roots, actinomycetes are mainly responsible for the symbiotic association. The nodulation in nonleguminous plants is so far reported in 150 species of 14 genera¹⁻³. No such report is available in the family astraceae to which the genus *Eupatorium* belongs.

Eupatorium, a common exotic weed of north-eastern India is one of the dominant species in the slash and burnt soils. It is an early colonizer on the denuded