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EFFECT OF AQUEOUS FOLIAR SPRAY OF LEAF EXTRACTS OF SOME PLANT SPECIES OF ASTERACEAE ON TIKKA DISEASE INCIDENCE % OF GROUNDNUT.

S.D. Kadlag[1], B.N. Zaware[2] and R.G. Khose[3]
1: Principal: Nutan Arts, Commerce and Science College Rajapur Tal.Sangamner , Dist. Ahmednagar(MS).
2: Principal: Mamasaheb Mohol College Kothrud, Pune (MS).
3: Ex-HOD Post Graduate of Botany, New Arts,Commerce and Science College Ahmednagar(MS).
Email- kadlagsubhash@gmail.com

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ABSTRACT:
Fungal pathogen *Cercospora personata* and *Cercospora arachidicola* that cause Tikka disease of groundnut is a serious disease that causes tremendous loss in the yield. Lesions appear on leaves and later become irregular, ultimately resulting drying and defoliation. Plants produce varieties of allelochemicals as natural secondary metabolites. These can be used as biocides that are eco-friendly i.e. biodegradable, renewable and abundantly available. There is a vast scope for research in investigating allelochemicals and use them in sustainable agriculture for food production without polluting environment. We tried to investigate biocidal effect of fresh leaf extracts for their fungicidal potential. It can be further used to find out its effect against phytopathogenic fungi that cause crop plant diseases.

Keywords: *Plant spp. Of Asteraceae family, tikka disease of Groundnut, antifungal.*

INTRODUCTION:

Allelopathy is defined as "Chemically elicited interactions among plants mediated by varieties of chemical compounds with different of modes of biochemical actions." Allelopathy is a multidisciplinary science where ecologist, chemists, physiologist and molecular biologist could contribute their skills. As a result of these studies development of new agro-chemicals, cultural methods for developing allelopathic crops with increasing weed resistance is possible. Since ancient times human societies all over the world have been using plant resources for fulfilling their basic needs like food, medicine etc. With the increase in human population demand for basic needs went on increasing. To meet the demands agricultural techniques, synthetic toxic biocides viz. nematicide, weedicides, herbicides, fungicides and insecticides and synthetic fertilizers have been used to increase the agricultural yields. Indiscriminate use of these and water developed severe environmental problems like water and soil water pollution. Our fertile lands are becoming non-fertile day-by-day. Increasing global awareness towards environmental pollution problems due to synthetic agrochemicals, has led researchers to find out safe alternatives.

Molisch (1937), a plant physiologist and the father of Allelopathy introduced the word "Allelopathy" for beneficial as well as harmful (detrimental) reciprocal biochemical interactions among plants including microorganisms. Allelochemicals are

the natural secondary metabolites produced by the plants.

Allelopathy, a current area of research, may be useful in agriculture to control fungal and bacterial diseases of crops. Plants contain varieties of chemicals that are produced as secondary metabolites. They are natural and easily biodegraded. Since botanical source of biocides is eco-friendly i.e. biodegradable, renewable and abundantly available, there is a vast scope for research in Allelopathy and investigating allelochemicals and use them in agriculture to sustain food production without polluting environment. The present paper will focus on the aspects of Allelopathic potentials of a common weed of Asteraceae family as fungicide.

REVIEW OF LITERATURE:

Govindasamy and Balasubramanian (1989) worked on biological control of groundnut disease by using *Trichoderma harzianum* that reduced germination % of uredospores. Govindaswamy (1989) c.f. Rice (1994) worked on controlling 'rust' in *Arachis hypogea* caused by *Puccinia arachidis*. Pre-treatment peanuts with conidia of *Trichoderma harzianum* inhibited germination and germ tube growth of the rust uredospores.

Kishore and Pande (2005) recorded that extracts of *Tagetes patula, Cymopsis teragolobus* significantly inhibited thegermination of spores of *Puccinia personata* and *P. arachidis*.

Riaz *et al* (2007) conducted experiments to assess effects of leaf residues of plants viz. *Parthenium hysterophorus* L., *Ageratum conyzoides* L. on mycorrhizal colonization and corm rot disease of *Gladiolus* caused by *Fusarium oxysporum f. sp. gladioli* (Massey) Snyd. and Hans.

Martyniuk and Bialy (2008) worked on antifungal activity of eight saponins obtained from *Medicago arabica.* Saponins 'hederagenin' with two sugars (glucose and arabinose) had higher antifungal effect than 'hederagenin' with one sugar arabinose. Saponins were inhibitory to *Aspergillus Niger, Fusarium oxysporum*, *Pythium aphanidermatum* and *Sclerotium rolfsii*.

Faizi *et al* (2008) worked antifungal as well as antibacterial activities of *Tagetes patula.* They isolated flavonoid patuletin which in minimum inhibitory concentration (MIC) inhibited growth of *Staphylococcus* spp., *Streptococcus* spp., *Micrococcus* spp. bacteria. Petroleum ether extract of roots inhibited the fungus *Candida albicans*.

Arslan *et al* (2009) evaluated antifungal activity of extracts of spices against bean rust caused by *Uromyces appendiculatus*. Extracts of Basil, black cumin, black paper, fennel, laurel, parsley, celery and rosemary were tested against the fungal pathogen. Fungicidal activity against bean rust was in an order of: Black cumin (*Nigella sativa* L.) > laurel > Basil > Celery > black paper > rosemary > fennel > parsley. Rust control efficacy in percentage of Black cumin (85%) was higher while that of Parsley (5.9%) was least.

Arora and Kaushik (2003) recorded that the extracts of *Conyza bonariensis* (L.) Crong and *Erigeron karvinskianus* DC. (Family Asteraceae) were highly fungicidal against soybean fungal pathogens viz., *Colletotrichum truncatum* (Schwein) Andrus & Moore, *Fusarium oxysporum* Schl. ex Fr. and *Macrophomina phaseolina* (Tassi) Goid.

Chuihua *et al.* (2004) found out that *Ageratum conyzoides* L., (Asteraceae family) contains allelopathins like 3-caryophyllene, p-bisabolene and p-farnescene that could exert synergistic inhibitory effect on test plants. It is herbicidal as well as fungicidal.

Patil and Kamble (2015) recorded that leaf extracts of *Eupatorium odoratum, Blumea balsminifera, Cassia tora* L, *Vitex negundo, Xanthium indicum* and *Hyptis suaveolens* inhibited spore germination of *Puccinia arachidis* Speg.

MATERIAL AND METHOD:

Study area: Ahmednagar district is the largest district of Maharashtra state. It is located between18^{0}2'and 75^{0}5'North latitude and 70^{0}9'and 75^{0}5'East longitude. It occupies an area of 17.035sq.km. Sahyadri ranges are present on northeast part of the district. Plant species were identified by using Flora of Maharashtra, Almeida (2001).

Groundnut 'HB11' variety of Mahadhan Pvt.Ltd. company, Indore (India) was sown in the field in Shendi village near Ahmednagar city in the month of April 2018. 30 DAS (30 days after sowing) spraying of extracts was started. 40% leaf extracts of ten selected plant species of Asteraceae were prepared. 40% mixture of all leaf extracts was also prepared. Spraying was done in the morning regularly 30, 40, 50 60 and 70 DAS (days after sowing). Control plants were sprayed with pure water. Readings were taken, tabulated and disease incidence % and Tikka disease incidence % were calculated **(Table 1 and Graph 1).**

RESULTS AND DISCUSSION:

Cynathillium cinereum (L.) H.Rob reduced the tikka disease incidence % from 16.36 to 11.40 i.e. by 4.96%.*Sphagneticola calandulacea* (L.) Pruski reduced the tikka disease incidence % from 21.98to 9.37 i.e. by 12.61%. *Erigeron bonariensis* Linn. reduced the tikka disease incidence % from 17.31 to 13.56 i.e. by 4.15% .*Launaea procumbens* (Roxb) Ramayya &Rajgopal reduced the tikka disease incidence % from 24.09 to 6.27 i.e. by 17.82%. *Tridax procumbens* (L.)L.reduced the tikka disease incidence % from 18.56 to 5.64 i.e. by 12.60 %.*Pluchea tomentosa* DC. reduced the tikka disease incidence % from 21.37 to 14.84 i.e. by 6.53% .*Tagetes erecta* **L.**reduced the tikka disease incidence % from 18.56 to 5.64 i.e. by 12.92%.*Parthenium hysterophorus* L.reduced the tikka disease incidence % from 19.70 to 10.98 i.e. by 8.72 % .*Synedrella nodiflora* (Linn.)Gaertn reduced the tikka disease incidence % from 17.90 to 13.96 i.e. by 4.06% .*Eclipta prostrata.* (Linn.)L reduced the tikka disease incidence % from 23.06 to 1.49 i.e. by 21.57% . Mixed leaf extracts of all ten plant species of Asteraceae reduced the tikka disease incidence % from 17.81 to 13.96 i.e. by 3.85%.

According to the Tikka disease incidence %, control of the disease by plant species of Asteraceae could be put in an order of: ***Eclipta prostrata >Launaea procumbens >Tagetes erecta > Sphagneticola calandulacea>Tridax procumbens > Parthenium hysterophorus >Pluchea tomentosa > Cynathillium cinereum >Erigeron bonariensis > Synedrella nodiflora >mixed*** (Table 1, Graph 1).More by *Eclipta prostrata* and less by *Synedrella nodiflora* and mixed spray.

Groundnut is one of the crops grown for seeds, oil and fodder. For controlling tikka, rust and other fungal diseases of valuable commodity groundnut (*Arachis hypogea* L.) crop synthetic fungicides like Aprop containing Azoxystrobin and Propiconazole, Bumper containing Propiconazole, Orius containing Tebuconazole, Plethora containing Novaluron and Indoxacarb, Benamain containing Carbendazim and Mainex containing Hexacoazole are being used by the farmers. To save poisoning and deteriorating soil, underground water by using hazardous nonbiodegradable synthetic fungicides, it is desirable to control fungal diseases using natural, easily biodegradable plant originated fungicides. Compositae (Asteraceae) is a cosmopolitan family. It is one of the dominant families of flowering plants. Majority grow in wild

nature. They are easily available. Many workers have been doing research on the species to find out their efficacy of biocidal (fungicide /insecticide / nematicide etc.) nature.

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Table No 1: Effect of foliar spray of leaf extracts of Asteraceae plants on Tikka disease incidence % on groundnut.

Spraying extract of plant species	30DAYS	40DAYS	50DAYS	60DAYS	70DAYS
Control No spraying	35.45	27.05	26.32	22.03	17.34
Pluchea tomentosa DC.	21.37	21.14	20.37	19.79	14.84
Synedrella nodiflora (Linn.) Gaertn.	17.9	17.07	15.75	14.72	13.96
Erigeron bonariensis Linn.	17.71	14.63	12.78	16.03	13.56
Cyanthillium cinereum (L.) H.Rob.	16.36	12.22	12.2	12.03	11.4
Parthenium hysterophorus L.	19.7	18.53	17.06	12.72	10.98
Sphagneticola calendulacea (L.) Pruski.	21.98	20.3	13.81	9.54	9.37
Mixed spray	17.81	16.43	13.11	9.84	13.96
Launaea procumbens (Roxb.) Ramayya & Rajgopal.	24.09	17.61	14.49	12.83	6.27
Tagetes erecta L.	18.56	18.32	13.72	9.02	5.64
Tridax procumbens (L.) L.	18.56	14.32	13.72	7.72	5.64
Eclipta prostrata (Linn.) L.	23.06	13.62	13.04	10.45	1.49

Graph No 1: Effect of foliar spray of leaf extracts of Asteraceae plants on tikka disease incidence % of groundnut.