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Identification of resistant lines of Groundnut (*Arachis hypogaea* L.) against Leaf spot and Rust diseases for coastal plains of Odisha

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Identification of resistant lines of Groundnut (*Arachis hypogaea* L.) against Leaf spot and Rust diseases for coastal plains of Odisha

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Major foliar fungal diseases of groundnut such as Early leaf spot (ELS) caused by *Cercospora arachidicola* Hori., Late Leaf spot (LLS) caused by *Phaeoisariopsis personata* Berk. & Curt., v Arx. and Rust caused by *Puccinia arachidis* Speg. act as the major constraints in groundnut growing tracts and can account for a loss in yield up to 70%. Management of these diseases involve a huge amount of chemical fungicides which in turn increases the cost of cultivation. In this context the present study was carried out with screening of 115 varieties of groundnut at central farm of Orissa University of Agriculture and Technology, Bhubaneswar in *rabi* season during the year 2015-16 to identify the suitable germ lines for coastal plains of Odisha. Out of 115 varieties screened 106 were reported to be resistant against ELS and 99 and 12 varieties against LLS and rust respectively

Key words: *Arachis hypogaea*, *Cercospora arachidicola*, *Phaeoisariopsis personata*, *Puccinia arachidis*

Groundnut (*Arachis hypogaea* L.) is one of the leading oilseed crops in Odisha as well as India both in production and consumption. The foliar fungal diseases such as Early leaf spot (ELS) caused by *Cercospora arachidicola* Hori., Late leaf spot (LLS) caused by *Phaeoisariopsis personata* Berk. & Curt., v Arx. and Rust caused by *Puccinia arachidis* Speg. serve as the major constraints in production and occur in all the groundnut growing tracts of the world. Both ELS and LLS can account for a loss in yield up to 50% all over the world but the extent of loss can vary considerably from place to place and between seasons. Rust can cause up to a loss of 100%. Protection by chemical fungicides is not economical for a resource poor state like Odisha. But managing these diseases with resistant lines can serve as an economically sustainable pathway of management. In Odisha, groundnut is cultivated in coastal plains both in *Kharif* and *Rabi* season. Hence, present study involved screening of 115 varieties of groundnut against leaf spots and rust to identify suitable resistant lines for coastal belts of Odisha.

Field trials were conducted in disease screening nursery with 115 genotypes during *kharif* 2015 and *rabi* 2015-16 at central farm of Orissa University of Agriculture and Technology, Bhubaneswar following the screening method described by Subrahmanyam *et al.* (1995). A total number of 115 germplasms were collected from AICRP on groundnut for evaluation. All genotypes collected were shown in 6 lines of 2 meter length with one infector row of TMV-2. All the varieties were applied with recommended dose of fertilizers, manures and irrigation. The varieties were subjected to natural infection and no fungicidal application was there. Intercultural operations were done as and when needed. Response of genotypes to disease severity of leaf spots and rust were recorded one week before harvest of the crop using modified 1-9 point scale. The genotypes were grouped into three categories as per their responses to these diseases. The varieties having severity score within 1-3 were categorized as resistant, varieties with a score of 3-5 were grouped as moderately resistant and varieties obtaining score more than 5 were put into susceptible category.

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Among all the 115 varieties screened the minimum

Table 1: Reaction of Groundnut varieties to foliar diseases like ELS, LLS, and Rust

Disease Reaction	ELS	LLS	Rust	Score
Resistant	AK-12-24 ,AK-159,Approva,Chico, CS-268,Devi,DH-101,DH-330,DH-40, DH-86,DSG-1,Gimnar-3,GPBD-4, ICGV-00338,07213,02038,02125, 02266,04017,05155,05158,06279, 6423,07210,07211,07214,07219, 07220,07222,07225,07228,07240, 07241,07247,07262,08142,08201, 08223,08699,09014,10004,86590, 92035,97182,98373,99195,00308,6285, 8143, 8176 ISP-4,Kadiri-5,6,NRCG-4468,94,Tag- 24,TG-37A,TG-38B,TG-38C,TG-51, TG-LPS-3,TPG-41,TPT-25,AVK-2013-5,6,10,11,12,ISK- 2012-1,2,3,5,6,8,10,11,12,13,14,15,16,18,28, 24,30,31,IVT-1-2012 1,2,3,4,5,6,7,13,14,16,29,30, GG-6, R-2001-3, Smruti, TG-38, ISK-I-2014-1,2,3,7	ICGV-05155, 07213, 05158, 6423, 07211, 07219, 07222, 07228, 07240, 07262, Kadiri-5,NRCG-4468	Approva, Chico, CS-268,Devi,DH-101,DH-330,DH-40, DSG-1,Gimnar-3,GPBD-4, ICGV-00338,07213,02038,02125, 02266,04017,05155,05158,06279, 6423,07210,07211,07214,07219, 07220,07222,07225,07228,07240, 07241,07247,07262,08142,08201, 08223,08699,09014,10004, 6285, 8143, 8176, 92035,97182,98373,99195,80308, R-2001-3, TAG-38, ISK-I-2014-I, 1,2,3,7,4, DH-2000-I, ISK-2012-9, 17, 8 ISP-4,Kadiri-5,6,NRCG-4468,94,Tag- 24,TG-37A,TG-38B,TG-38C,TPG-41,TPT-25,AVK-2013- 5,6,10,11,12,ISK-2012-1,2,3,5,6,8,10,11,12,13,16,18,28, 24,30,31,IVT-1-2012 1,2,3,4,5,6,7,16,29,TG-51	1-3
Moderately resistant	DH-43,DH-2000-1, TMV-2, ISK-I-2012-9,17,8, ISK-I-2014-4,5,6	AK-12-24,Approva,Chico, CS-268,DH-101,DH-330,DH-40,DSG-1,Gimnar- 3,GPBD-4, ICGV-00338,02038,02125, 04017,07210,07220, 07225,07241,08201,08223, 08699,10004,86590,97182 IVT-I-2012-7,8,9,29,AK-159, Devi, ICGV-06279, 07214, 09014, 98373, 99195,ISP-4, Kadiri-6, NRCG-94, TAG-24,TG-37A, TG 38C, TG-51, TPG-41, TPT-25, AVK-2013-5,6,10,11,12, ISK-2012-2,3,5,6,12,13,14,15,16,18, 28, 24, 30,31, IVT-I-12-1,3,4,5,6,13,14,16,30, R-2001-3,TAG-38, ISK-I-2014-4,5,6	AK-12-24,AK-159,DH-43,DH-86, ICGV-86590, Smruti,TG -51,TG-LPS-3, TMV-2,ISK-1- 2012-14,15,IVT-1-2012-13,14,30,ISK-1 2014, 5,6	3-5
Susceptible	-	DH-43,DH-2000-1,DH-86,GG-6,ICGV- 02266,06285,07217,07247,08142,08143,0817 6,80308,87846,92035,99195,Smruti,TG- 38B,TG-LPS-3, TMV-2,ISK-1-2012 1,8,10,11,17,IVT-1-2012-2,7,	-	>5

severity score was 1 and the maximum was 7. The varieties categorized according to their disease severity are enlisted in Table 1. Out of 115 varieties screened against early leaf spot 106 were reported to be resistant (severity score of 1-3). Rest nine varieties were moderately resistant to ELS. But the number of resistant varieties against LLS was very less as compared to ELS and rust. It was only twelve namely ICGV 07213,05155,05158, 6423,07211,07219, 07222,07228, 07240,07262, Kadiri-5 and NRCG-4468. Seventy seven lines were reported to be moderately resistant and twenty six were having a susceptible reaction to LLS. Considerable variations were noted among genotypes with respect to severity of leaf spot diseases. Ninety nine varieties showed resistance response against rust and 16 were reported to be moderately resistant. Cultivars tested in a varietal trial responded differently to rust for all parameters except sporulation. NC 17090 had the lowest disease score followed by NC 17135, while the three

susceptible cultivars, Chico, Tainan 9 and Lampung had the highest disease scores (Pensuk *et al.* 2003).

The twelve varieties namely ICGV 05155, 07213, 05158, 6423, 07211, 07219, 07222, 07228, 07240, 07262, Kadiri-5 and NRCG-4468 are resistant against ELS, LLS and rust. These varieties can be a better choice over chemicals in the coastal plains of Odisha.

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