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"PHULE SONALI" COWPEA VARIIETY FOR WESTERN MAHARASHTRA

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ABSTRACT

A cowpea genotype, *Phule Sonali* is a white seeded cowpea genotype derived through the pedigree selection method from a cross of RC 101 x Phule Vithai made during 2011. The selections were made in F_2 population during 2013-14 and evaluated for yield and disease resistance for subsequent generations during 2012-13 to 2017-18. It was evaluated in station trial for yield evaluation repeatedly during 2016-17 and 2017-18 and tested in University multilocation varietal (13) trial during *Kharif* 2017-18 and 2018-19, were conducted at Agricultural Research Station Pandharpur, Solapur, Mohol, Karad, Rahuri, Badnapur and Akola. The genotype Phule Sonali consistently out yielded On the basis of overall mean performance of 13 locations the genotype Phule Sonali recorded (1392 kg/ha) seed yield as against the checks Phule vithai (1210 kg/ha), Phule Rukhhumai (1001 kg/ha) and RC 101 (1068 kg/ha). It was increased seed yield over the checks Phule vithai, (13.07 %) Phule Rakhumai (28.08%) and RC 101 (23.27%). Simultaneously it was evaluated in All India Coordinated Initial Varietal Trial during 2017-18 at 10 locations for South zone. A genotype Phule Sonali consistently recorded higher seed yield than the checks PCP 306-1 (6.5 per cent), GC 3 (5.9) per cent and TPTC (4.03) percent. The performance in station and University multilocation varietal trial, it gave higher yield than the check Phule Vithai (12.45%) and PCP -0306-1 (19.49%). A genotype early (71-75 DAS) to maturing, Dwarf bushy, Determinate erect growth habit with synchronous maturity, complete non-viny, dark green leaves and bold (13.50 g) size and kidney shape seeds, moderately resistant YMV and CYMV and free from dry root rot, Minor incidence of Pests. Good bold grains of quality in respect of milling, cooking, rich in protein and amino acids having good yield potential. The overall mean performance of the genotype Phule Sonali consistently recorded the higher yield than all the checks included in respective trials. It was recommended and released as a Phule Sonali for seed purpose during 48th Joint Agresco at PDV, Akola during 29-31st November, 2020 for seed purpose cultivation in Western Maharashtra.

Key words *: Phule sonali, resistance, quality, cowpea, determinate.*

Cowpea is an important and popular nutritive food legume in India comprising four cultivated subspecies are recognized *Vigna unguiculata subsp. cylindrica Catjang, Vigna unguiculata subsp. dekindtiana , Vigna unguiculata subsp. sesquipedalis Yardlong bean and Vigna unguiculata subsp. unguiculata Black-eyed pea*. These cultivated species are indeterminate types early and long duration types.

Determinate : Determinate are called, Fixed, Shuttled, Specified type of plants they stop growing when fruit/pods are setting on the terminal or top bud and matures at the same time (2-3 week) then die.

Indeterminate : Indeterminate are called Viney types plants they wii grow and produce fruit/pods until they killed by other natural calamities. They grow up to 6-7 ft. through the season (1).

Cowpeas are an important source of protein in developing countries, especially where they are eaten in a variety of ways (2). A number of studies have been directed toward improving traditional cowpea Products and processes for making them (3), including a major effort in this department (4). Likewise, research has been applied to developing new food ingredients and products made from cowpeas and other starchy legumes (5). Extrusion cooking is one of the most versatile and efficient techniques for producing ingredients and novel foods (6), although its application to starchy legumes has been limited. Several authors have studied the effects of extrusion on either nutritive quality (7) or on texture (8) of grain legumes including cowpea. However, with few exceptions (9), studies on both textural and nutritional properties of the same products have not been presented. Cowpeas are also processed into paste for the preparation of various traditional foods, such as Akara (fried cowpea paste and Moinmoin, steamed cowpea paste) (10). Attempts to expand utilization of cowpea include investigation on processing into flour (11) and investigation into fungal fermentation of cowpeas (12). Cowpea (*Vigna unguiculata*) is an important source of plant protein crop. Cowpea is starch-protein seeds offering a wider pattern of utilization than any other legume (10). Because of it's special features and great demand, there was an urgent need to develop wider adaptable early dwarf high yielding, determinate with synchronous maturity white seeded cowpea. Hence, efforts are being made to develop and modify the cowpea genotype to a determinate with better yield.

MATERIALS AND METHODS

A cross between RC 101 and Phule Vithai was carried out at Pulses and Oilseed Crop Research and Training Centre, Pandharpur during the year 2011-12. The F_2 population was grown in the year 2013-14. The selections

Table-1 : Mean performance of *Phule Sonali* in different Trials.

S.N.	Name of trial, year and No. of locations	Seed Yield (kg/ha)				S.E. +	C. D. at 5%	C.V. (%)
		Phule Sonali	Phule Vithai Ch1	Phule Rakhumai Ch2	RC 101 Ch3			
1.	UMLT (2017) (7)	1361	1210	1139	-	96	282	46
2.	UMLT (2018) (5)	1425		874	1193	110	321	18
3.	Station trial (2016) (1)	1392	-	991	942	71	206	16
	Total (13)	4178	1210	3004	2135			
	Mean	1392	1210	1001	1068	-	-	-
	% increase over Ch1		13.07					
	% increase over Ch2		28.08					
	% increase over Ch3		23.27					
	Coordinated trials	Phule Sonali	PCP 0306-1 Ch1	GC 3 Ch2				
4.	South Zone (IVT 2017)	1018	1040	1046				
	% increase over Ch1		6.9					
	% increase over Ch2			5.9				

Table-2 : Mean ancillary data under POCRTC, Pandharpur (I) and ARS, Mohol (R).

Genotypes	Days to 50% Flowering	Days to Maturity	Plant Height (cm)	Bran-ches/ Plant	Pods/ Plant	Seeds/ Pod	Pod length (cm)	100 seed weight (g)
Phule Sonali	42	75	41.3	4	17	16	15.9	13.50
Phule Vithai (C)	45	80	45.0	3	17	13	12.9	10.69
Phule rukmini (C)	44	92	41.0	3	16	10	11.0	8.91

were made in F_2 as well as further segregating populations till 2015-16 when F_5 generation stage was achieved. At this stage the population was homogeneous. Among the several selections made in segregating populations, a strain PCP 1123 appeared early, dwarf, bushy, determinate with synchronous maturity to be most promising (Fig.-1). The experiment was laid in randomized block design with three replications having plot size of 1.80 x 4.0 m with spacing of 45 cm between rows and 15 cm between plants with 14 genotypes. It was therefore tested in yield evaluation trial alongwith check Phule vithai at Pulses and Oilseed Crop Research and Training Center, Pandharpur, Dist.: Solapur under protective irrigated condition in the year 2017-18 and at Agril. Research station Mohol in the year 2017-18 under rain fed condition. On account of the promising performance, this strain was tested in reformed station trial during 2016-17 and promoted to University Multilocation Trials conducted at Rahuri, Pandharpur, Solapur, Mohol, Karad , K.Digraj, ARS Dhule, ARS Chas, ARS Badnapur and Sr. Scientist, Pulse Improvement Project, Akola under rain fed and Irrigated condition1 during 2017 -18.

Due to superior performance the genotype was tested in Initial Varietal Trial during 2017-18. The performance of this genotype was consistently superior to the check varieties Phule Vithai and Phule rukmini in UML Trails ARS, Pandharpur and Mohol for yield ancillary characters and disease reactions.

RESULTS AND DISCUSSION

Performance of Phule Sonali in different trials : Over all mean performance (Table-1) In University Multilocation and station trials conducted during 2016-17, 2017-18 the yield differences due to genotypes were statistically significant. The Variety Phule Sonali (1392 kg ha^{-1}) recorded 13.07 and 28.08 , 23.27 per cent higher yield over check varieties Phule Vithai (1210 kg/ha), Phule rukmini (1001 kg ha^{-1}) and RC 101 (1068 kg/ha). Similarly the Variety was tested in coordinated trials 2017-18 The variety Phule Sonali (1018 kg/ha) gave significantly higher yield 6.9 and 5.9 over the superior check PCP 0306-1 (1040 kg/ha) and GC 3 (1046 kg/ha).

On the basis of its better performance and consistency in yield, in University Multilocation, Coordinated trials and quality characters it was released during 48th Joint Agre sco meeting at PDKV, Akola for seed purpose for Western Maharashta.

Pest and diseases : The reactions of cowpea variety to pod borer, yellow vein Mosaic and disease reactions reaction was moderately resistant.

Morphological characters : The variety Phule Sonali is Early, Determinate, Bushy and white seeded requires 42 days to 50% flowering, 75 days to mature was earlier than both checks Phule Vithai and Phule rukmini. This genotype is medium for plant height (41.3 cm) and has

Cowpea Variety Phule Sonali

higher number of branches plant^{-1}(4.0), pods per plant (17.0) seeds per pod (16.0), pod length (15.9 cm) and 100 seed weight (13.50 g) than the checks.

CONCLUSIONS

Over all mean performance of Variety Phule Sonali is an early, determinate, dwarf, high yielding moderately resistance to pest and diseases and also fetches higher market price than ruling varieties Phule Vithai and Phule rukmini a white seeded cowpea Determinate genotype Phule Sonali Cowpea Variety was released for cultivation in Western Maharashtra (Fig.-1) for dry land conditions.

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