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Research Article

A high yielding short duration cowpea (*Vigna unguiculata*.L) variety 'Hridya'

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Abstract:
Breeding experiments was conducted at Onattukara Regional Agricultural Research Station, Kayamkulam,Kerala Agricultural University to evolve a high yielding cowpea variety with synchronized maturity during 2000-09. Local cultivars and released varieties like V-2, CO-3, COVU-358, COVU-8456, V-118 and COVU-623 were used as parents in the programme. A short duration cowpea variety with synchronized maturity was identified and released as 'Hridya' at the state level variety release committee during 2010. This variety was developed by mass selection of the lacal Kuttipayar.The important charecteristics of the variety are the height is 45 cm, pod colour is green, seed colour is straw, and the 100 seed weight is 4.67g. The productivity of the variety is 9.5 q $ha^{-1}$and the duration is 55 days.

Key words: Cowpea, synchronized maturity, grain yield, short duration

Introduction

India is the major pulse growing country of the world accounting approximately one third of the world area and one fourth of the world production. Pulses, also called grain legumes have been valued as food, fodder and feed. Major factor for sustainable soil productivity in this country has been the highly diversified nature of the cropping pattern, which should include a pulse crop as one of the components which will enrich the soil with nutrients. Moreover, the deep penetrating root systems enable them to utilize the limited available moisture more efficiently and will loosen the soil..Pulses are more drought resistant than many other cereal crops. Most of the world's cowpeas are grown primarily in dry regions where drought is prevalent among several yield reducing factors (Watanabe *et al*., 1997) and are important sources of protein (20-30%).

Cowpea (*Vigna unguiculata*.L) is an important pulse crop which can be cultivated throughout the year. It is one of the most ancient food crops known to man. It is cultivated for green pods as vegetables or for grain or for fodder purposes. The traditional varieties of cowpea are shy bearers and susceptible to pests and diseases. They are highly photosensitive, late maturing and are characterized by trailing growth habit associated with heavy spreading branches. The indeterminate growth habit makes it difficult to fit into any successful multicropping systems (Jeswani and Baldev, 1990).

Material and Methods

Realising that all the grain types are shy bearers and late maturing, a breeding programme was started at ORARS, Kayamkulam, to develop a high yielding short duration cowpea variety with synchronized maturity suited to the summer rice fallows of Onattukara.. In this experiment several local cultivars and released varieties viz. V-2, CO-3, COVU-358, COVU - 8456, V-118 and COVU - 623 were collected, evaluated and hybridization was carried out between selected parents. Promising segregants were identifieds and forwarded to yield trials. Initial evaluation trial was conducted with seven promising cultures. Comparative yield trials were conducted for three years with three selected cultures. Farm trials were conducted for one year. Statistical analysis of the data was carried out (Panse and Sukatme, 1990). Pests and disease scoring was also conducted. Based on the standard procedures, the grain quality and acceptability were also analysed.

Results and Discussion

The data on Initial Evaluation Trial conducted during 2004-05 at Onattukara Regional Agricultural Research Station. Kayamkulam is presented in Table 1. The results showed that Culture 3 recorded the highest yield followed by Culture -5 .But these two cultures were medium duration (75-80 days) types and a minimum of two pickings were necessary to harvest the crop. Culture 9 and Culture 10 were with extra short duration (50 days). Culture 9 and Culture 10 also exhibited uniform maturity. Culture 9 recorded higher yield (920 kg ha^{-1}) than Culture 10 (900 kg ha^{-1}). This culture was developed by mass slection from the local Kutti payar. Comparative Yield Trials were conducted for three years during 2005-08 and the data is presented in Table 2. The

pooled analysis data revealed that the yield recorded by Culture 9 (986kg ha^{-1}) was low but on par with the check variety Kanakamony(1151 kg).. But the per day productivity of culture 9 was higher (18.67 kg) than the check variety, Kanakamony (13.54 kg) .Farm trial was conducted during 2008-09 at 10 different locations (Table-3) and Culture 9 (Figure.1) recorded an average yield of 980 kg ha^{-1} ie. 3.2 % increase over the check variety Kanakamony.

There was no major pest and disease incidence for this variety. The incidence of aphid, american serpentine leaf miner, pod borer and rust is very low (Table-4). The morphological observations were recorded and was presented in Table 5. The vegetative part of the plants was green in colour, corolla was creamy white, dry pod and seed colors were straw (Figure. 2) . The 100 seed weight was 4.67 g and duration of the variety was 50-55 days.The protein content of dry grain was 19.5% and L/B ratio was 1.61 before cooking and 2.9 after cooking.

Considering all the meritorious characteristics of Culture 9, it was released by the state variety release committee as a new grain cowpea variety with the name “Hridya” for the summer rice fallows of Alappuzha and Kollam districts. It is highly suited to the rice-rice-pulse cropping sequence of this region.

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Table 1. Performance of culture 9-Hridya, in the Initial Evaluation Trial

Culture	Days to 50% flowering	Duration (days)	Plant height (cm)	No. of pods/ plant	Pod length (cm)	Seeds / pod	100 seed weight (g)	Seed yield (kg ha^{-1})
Culture 1	47	80	47.33	5.67	12.95	13.20	13.05	750
Culture 2	45	85	45.20	8.22	12.50	12.05	12.90	830
Culture 3	45	75	56.87	17.93	18.00	16.50	13.41	1000
Culture 4	48	85	48.93	11.93	15.83	15.56	13.65	650
Culture 5	45	80	58.03	17.67	18.60	18.20	13.88	1050
Culture 6	46	85	62.43	11.77	12.33	10.82	13.66	650
Culture 7	45	82	60.23	15.60	16.83	14.80	14.98	850
Culture 9	38	50	39.47	17.37	9.20	12.20	4.67	920
Culture 10	38	50	39.47	17.37	9.00	12.00	4.52	900
Check (Kanakamony)	50	80	60.23	15.83	17.8	15.6	12.59	850
CD			NS	1.04	1.40	NS	0.55	190

Table 2. Seed yield of culture 9 - Hridya in Comparative Yield Trial (Yield in kg ha^{-1})

Culture	2002-03	2003-04	2004-05	Pooled mean
Culture 3	1180	1140	1250	1190
Culture 5	1020	1140	1160	1106
Culture 9	980	1020	960	986
Check (Kanakamony)	1000	1100	1080	1060
CD				84

Table 3. Results of farm trials conducted during 2005-06 (Yield in kg/ha)

Location	Culture 5	Culture 9	Check (Kanakamony)
Vallikunnam	1075.0	900.0	925.0
Elippakulam	1050.0	1000.0	1025.0
Choonad	1150.0	987.5	900.0
Kappil	1112.5	1050.0	887.5
Muthukulam South	1050.0	900.0	950.0
Muthukulam North	1012.5	1000.0	1000.0
Keerikkad	1037.5	1062.5	887.5
Chavara	1050.0	900.0	975.0
Sankaramangalam	1100.0	1050.0	1050.0
Mukundapuram	1150.0	950.0	900.0
Pooled mean	1072.0	980.0	950.0
% increase over check	12.8	3.2	

Table 4. Reaction to pests and diseases

Culture	Incidence of Aphid	ASLM	Pod borer (%)	Rust (0-9)
Culture 3	Moderate	2.5	41.2	1.2
Culture 5	Mild	1.7	27.8	0.75
Culture 9	Mild	0.1	1.0	0.20
Check (Kanakamony)	High	1.9	28.6	2.1

Table 5. Morphological Characters of the variety

I. Vegetative characters		
1. Hypocotyl colour at 10th day of emergence	:	Green
2. Growth habit	:	Short stature and erect
3. Primary leaf shape	:	Ovate
4. Terminal leaflet shape	:	Ovate
5. Leaf pubescence	:	Glabrous
6. Petiole colour	:	Green
7. Stem colour	:	Green
II. Inflorescence and fruit characters		
1. Peduncle colour	:	Green
2. Calyx colour, Corolla colour	:	Green , Creamy white
3. Pod attachment to the peduncle	:	Pendent
4. Immature pod colour	:	Green
5. Dry pod colour	:	Straw
6. Pod pubescence	:	Glabrous
7. Seed colour	:	Straw colour seeds
8. Hilum	:	Brown
III. Quantitative characters		
1. Days to 50% flowering	:	38 days
2. Number of pods per plant	:	16.0
3. Length of pod (cm)	:	9.2
4. Number of seeds per pod	:	12.2
5. Weight of 100 seeds (g)	:	4.67
6. Duration (seed to seed)	:	50-55 days
7. Seed yield	:	9.5q ha^{-1}

Figure.1 Hridya in the field

Figure. 2 Grains of Hridya