

## Kanchi (CO 34) and Cauvery (CO 35) - Two New Early Varieties of Rice from Tamil Nadu

by

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**Introduction:** The introduction of Taichung (Native) 1 in 1964 revolutionised the very concept of rice breeding in India. This Taiwan *indica* variety possessed a very high yield potential compared to tall *indica* so far grown. This highlighted a break through in the yield levels possible in India with the substitution of the improved plant type that the Taichung (Native) 1 possessed. The improved plant type refers to the change in the architecture of the rice plant characterised by dwarfness of about 90 - 100 cm in height, erect habit, and a dark green foliage which increase photosynthetic efficiency and high fertilizer responsiveness resulting in high yield potential and insensitiveness to photoperiod. Introduction of new varieties like T(N) 1. from abroad may not be a permanent solution to varietal needs of the diverse agro-climatic regions and consumer preferences in India. Hence, recognising the merit of dwarfism and improved plant type a hybridisation programme was initiated at the Paddy Breeding Station, Coimbatore in 1965 with the object of infusing this desired plant type into the local improved popular strains possessing other traits of local importance and consumer preferences. Two of the early examples of the successful out-come of this hybridisation programme are the new strains KANCHI (CO 34) and CAUVERY (CO 35).

**Materials and Methods:** With the object of infusing the improved plant type with the associated characters of Taichung (Native) 1 into the popular local varieties, crosses were effected at the Paddy Breeding Station, Coimbatore employing Taichung (Native) 1 as the female parent with local popular varieties CO. 29 and TKM. 6. CO. 29 is an early variety with moderate resistance to blast disease (*Pyricularia oryzae*) and relatively finer grain quality. TKM. 6 is another early variety with fine white rice. Both these varieties are cosmopolitan with wide adaptation and grown almost throughout Tamil Nadu. TKM. 6 is resistant to stem borer and possesses seed dormancy also. The important characteristics of the local parents CO. 29 and TKM. 6 are furnished below:

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	CO. 29	TKM. 6
Origin	CO. 13 × CO. 4	CO. 18 × GEB. 24
Maturity in days	110	115
Tillering	10 - 12	8 - 10
Plant height (cm)	125 - 130	130 - 135
Anthocyanin pigment	Present	Absent
Panicle length (cm)	22.5	22.0
Rice Colour	Dull white	White
Abdominal white	Absent	Absent
1000 - grain wt.	22.8	17.8
Grain size (mm)		
Length	8.4	8.0
Breadth	2.6	2.0
Thickness	1.9	1.7
Commercial grade	Medium bold	Medium slender
Cooking quality	Good	Good
Disease resistance (Blast)	Resistant	Susceptible
Pest resistance (Stem borer)	Susceptible	Resistant
Lodging resistance	Susceptible	Susceptible

After intensive study of the progenies in the early generations upto F4 or F5 promising selections were carried over to the All India Coordinated Rice Improvement Project for testing under the Initial evaluation Trials (IET). The promising selections were then promoted to the Uniform Variety Trial (UVT) for assessing their yield potential simultaneously in different locations in India. Finally they were tried in the districts of Tamil Nadu before release as strains.

**Results:** The pedigree along with the development of the strains are described below:

a) *Pedigree of the Varieties:*

	IET.400	IET 355
Rabi 1965	The cross T(N)1 × CO.29 effected	The cross T(N)1 × TKM.6 effected
Kharif 1965	F1 plants studied	F1 plants studied
Rabi 1966	F2 progenies studied	F2 progenies studied
Kharif 1966	Promising selections studied in F3 generation	Promising selections studied in F3 generation
Rabi 1967	Promising progenies studied in the F4 generation	Promising selections carried over and tested under the Initial Evaluation Trial in F4 generation
Kharif 1967	Promising selections carried over and tested under the IET in the F5 generation	The promising selections tested under the Preliminary Variety Trial (PVT)
Rabi 1968	The promising selections again tested under IET	One of the promising selections IET. 355 promoted and tested under the UVT with other early varieties in different locations

	IET. 400	IET. 355
Kharif 1968	One of the promising selections IET. 400 promoted and tested under the UVT with other early varieties in different locations	Again tested under UVT
Rabi 1969	IET.400, tested again under UVT	IET.355 tested again under UVT
Kharif 1969	IET.400 tried in the districts	IET.355 tried in the districts

b) *Yield performance of the Varieties:* The selection IET. 400 gave the highest yield from 14 locations in the UVT conducted under the All India Coordinated Rice Improvement Project during *Kharif* 1968. In the same trials during *Kharif* 1969 it ranked first in 30 locations all over India. In Tamil Nadu it gave the highest yield during both *Rabi* and *Kharif* seasons from 1968 onwards. In the other trials conducted in the State it has recorded substantial increase over CO. 29 *i.e.* up to 37% under high level of manuring and has consistently recorded higher yields than Karuna (CO. 33) and ADT. 27. It has recorded the maximum yield of 7.33 tonnes of grain per ha at Kancheepuram. The data of yield performance of the varieties are furnished in Table 1.

TABLE 1. *Kanchi* as compared to Local Varieties in the Trials of the All India Coordinated Rice Improvement Project in 18 locations in India during *Kharif*, 1969

Average grain yield kg/ha

Locations	Kanchi			Local		
	High manuring	Low manuring	Mean	High manuring	Low manuring	Mean
Wangbad	5104	3437	4271	4375	3437	3906
Faizabad	4215	3433	3824	3706	3507	3637
Nagina	4810	4511	4661	5440	4736	5088
Karnal	3845	3363	3604	3250	3194	3222
Kapurthala	4093	4093	4093	4428	3977	4202
Kanke	4667	3552	3859	4237	3510	3875
Bhubaneswar	4400	3049	4024	4813	4261	4537
Jabalpur	5500	5997	5748	3424	3238	3331
Rewa	5260	4708	4984	3379	3421	3400
Rajendranagar	4099	3943	4021	2543	2498	2521
Amaravathi	5044	4076	4560	2874	2519	2697
Garikapadu	5251	4059	4660	3945	2987	3466
Nawagam	5607	4334	4971	5482	4022	4752
Sindewahi	3747	3645	3696	3443	3110	3276
Ratnagiri	3984	3750	3367	3734	3739	3737
Coimbatore	5289	3774	4531	3868	3611	3740
Aduthurai	4610	4457	4533	4245	3791	4019
Pattambi	3913	3930	3921	3963	4385	4174

*Kanchi as compared to the local strains in Tamil Nadu (Average yield kg/ha)*

	High level of manuring	Percentage over local	Low level of manuring	Percentage over local
Kanchi	4823	137	3440	105
CO.29	3526	100	3292	100
Kanchi	5072	102	4472	102
Karuna	4976	100	4388	100
Kanchi	4610	103	4245	112
ADT.27	4457	100	3791	100

*Performance of Kanchi in the different Districts in Tamil Nadu (Average yield kg/ha)*

	High level of manuring	Low level of manuring
<i>1969-70 Early Samba</i>		
Novlock	4580	5300
Keela Gudalur	4416	4333
Danishpet	4500	4500
Mettur	4866	4666
Kariyiruppu	4583	3583
Meagaram	3500	4833
Kancheepuram	7333	6166
Vandarayanpet	4076	3396
Siru Kaveripakkam	5000	4333
<i>1969-70 Late Samba</i>		
Kancheepuram	7166	6666
Novlock	5541	5000
Danishpet	4333	3666
Mettur	3833	3666

The Selection IET. 355 has recorded the highest yield in four locations under the UVT conducted under the AICRIP during *Kharif* 1969 and in general it was among the highest yielders in the trials of the AICRIP during both the seasons in 1968 and 1969. In the trials conducted in Tamil Nadu, IET. 355 registered consistently substantial increase over TKM. 6 upto 52% under high level of manuring. It has also recorded higher yields over CO. 29, Karuna and ADT. 27 with increase ranging from 4% to 32%. A maximum yield of 9.4 tonnes per ha. was recorded at Athiyandal under high level of manuring. The data of yield performance of the variety are furnished in Table 2.

TABLE 2. *Cauvery as compared to local varieties in the trials of the All India Coordinated Rice Improvement Project in 18 locations in India during Kharif 1969*

Average grain yield kg/ha

Locations	IET. 355			Local		
	High	Low	Mean	High	Low	Mean
Wangbad	4979	3594	4036	4375	3437	3906
Farizabad	3681	3036	3359	3706	3567	3637
Nagina	3986	3641	3814	5440	4736	5088
Karnal	3811	3363	3587	3250	3194	3222
Kapurthala	3575	3691	3633	4428	3977	4202
Kanke	3969	3198	3583	4239	3510	3875
Bhubaneswar	3385	2725	3055	4813	4261	4537
Jabalpur	4583	5298	4941	3424	3238	3331
Rewa	4029	4454	4242	3379	3421	3400
Rajendranagar	4008	4337	4172	2543	2498	2521
Amaravathi	4613	3892	4252	2874	2519	2697
Garikapadu	4850	3934	4392	3945	2987	3466
Nawagam	6108	4471	4290	5482	4022	4752
Sindewahi	2893	3262	3077	3443	3110	3276
Ratnagiri	4106	3955	4031	3734	3739	3737
Coimbatore	4829	3760	4305	3868	3611	3740
Aduthurai	4557	4351	4454	5245	3894	4019
Pattambi	3710	4216	3963	3933	4385	4174

*Cauvery as compared to the local strains in Tamil Nadu*

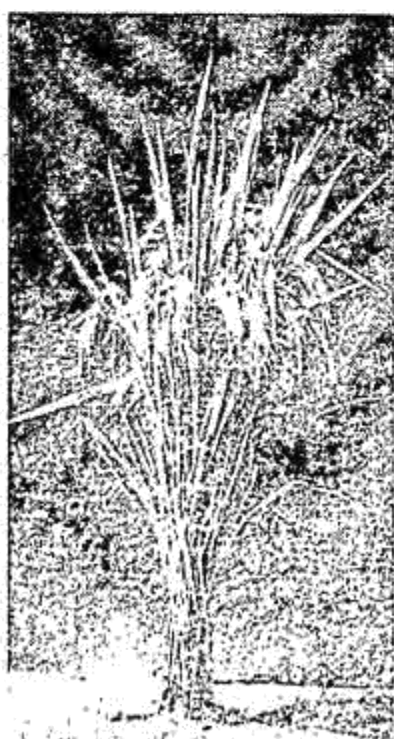
	High level of manuring	Percentage over local	Low level of manuring	Percentage over local
Cauvery	4400	132	3445	105
CO.29	3326	100	3292	100
Cauvery	5196	104	4576	104
Karuna	4976	100	4388	100
Cauvery	4557	105	4245	112
ADT.27	4351	100	3794	100
Cauvery	6570	152	—	—
TKM.6	4335	100	—	—

## Performance of Cauvery in the different districts in Tamil Nadu

(Average yield kg/ha)

	High level of manuring	Low level of manuring
<i>1969-70 Early Samba</i>		
Navlock	4180	3230
Keela Gudalur	5000	3833
Danishpet	4500	4000
Mettur	6333	5500
Melagaram	6500	6833
Kancheepuram	6833	4156
Athiyandal	9400	8736
Vandarayanpet	4076	3396
Siru Kaveripakkam	4750	3833

c) *Release of the Varieties:* During the annual workshop meeting of the All India Coordinated Rice Improvement Project held at Cuttack in May, 1970 these two selections IET. 400 and IET. 355 were recommended for release as improved strains and proposals for their release were approved by the Central Variety Release Committee at its meeting held in New Delhi on 15th September, 1970. Subsequently on 24th November 1970 the Tamil Nadu State S.ed Committee released IET. 400 in the name of Kanchi (CO. 34) and IET. 355 in the name of Cauvery (CO. 35) (Plate 1 and 2).



Kanchi (CO. 34)



Cauvery (CO. 35)

The morphological and Physiological description of the varieties are given in Appendix I. The Package of practices for both the varieties are furnished in Appendix II.

## APPENDIX - I

	Kanchi (CO.34)	Cauvery (CO.35)
✓ Habit	Erect	Erect
✓ Plant Height	85 cm to 90 cm	85 cm to 90 cm
✓ Maturity	110 to 115 days	100 to 108 day
✓ Tillering	10 - 12	10 - 12
✓ Anthocyanin Pigment	Present	Absent
Leaf sheath	Light purple lines at the base	Green
Axil	Very light purple	Green
Internode	Green	Green
Juncture	Colourless	Colourless
Auricle	Colourless	Colourless
Ligule	White	White
Pulvinus	Green	Green
Septum	Green	Green
Leaf blade	Green	Green
Flag leaf	Medium and Acute	Medium and Acute
Lemma and Palea	Green when immature, developing into straw with occasional dirty colour when ripe	Green when immature, developing into straw when ripe
Apiculus	Light purple	Green
✓ Awns	Absent	Absent
✓ Panicle	Long and compact	Long and compact
✓ Kernel (Rice)	White, translucent non-glutinous	White, translucent non-glutinous
Scent	Absent	Absent
Abdominal white	Absent	Absent
✓ 1000 - grain wt.	21.3	22.3
✓ Grain size (mm)		
i) Length	8.34	8.38
ii) Breadth	2.94	2.93
iii) L/B ratio	2.28	2.32
Commercial grade of grain	Medium fine	Medium fine
Hulling percentage	77	80
Milling percentage	62.4	61.4
Head rice recovery (% of milled rice)	70	69
Cooking quality	Very good	Very good
Photosensitivity ✓	Insensitive	Insensitive
Lodging resistance ✓	High	Moderate
Fertilizer responsiveness	High	High
Shattering resistance	Medium	Medium
Protein percentage	9.3	8.9
Adaptability	Wide range of adaptability; can be grown wherever CO 29 is grown	Wide range of adaptability best suited to fit in the multiple cropping pattern

## APPENDIX II

*Important package of practices over and above the usual cultivation practices to be adopted for the varieties*

1. Seed rate : 45 kg/ha to be sown at the rate of 1.5 kg per cent.
2. Treat the seed with organo-mercuric compound at 2 gm per kg of seed.
3. Raise 30 cents of nursery for planting one hectare.
4. Transplant 20-22 days old seedlings.
5. Plant two seedlings per hole.
6. Spacing of 20 cm×10 cm may be adopted.
7. Manuring and fertilization : apply 12.5 tonnes of Farm-Yard Manure or compost or 5.7 tonnes of green manure per ha. Fertilizer schedule (kg/ha).

	N	P	K
Basal - 1 At last ploughing	60	60	60
Top dressing :			
25 days after transplanting	60	—	—
Total kg/ha	120	60	60

8. After cultivation : One or two weedings as found necessary.
9. Plant protection (a) spray 0.05% parathion or 0.04% Endrin a week before pulling out the seedlings. (b) Spray the transplanted crop once in 15 days till boot leaf stage with parathion or Endrin and with copper fungicide at 1.5 kg per hectare. (c) If other insect pests like jassids, leaf eating caterpillars are found in the main field, dust BHC 10% and DDT. 5% in equal quantity. (d) Dust BHC 10% against earhead bug and fulgorid bug at milk stage of the crop.

**Conclusion :** The new early strains Kanchi (CO. 34) and Cauvery CO. 35 are examples of successful incorporation of the improved plant type into the local promising varieties. "Kanchi" [T (N) 1×CO. 29] possesses high yield potential, fertilizer responsiveness non-lodging character, good quality grain, wide adaptability and is intended to replace CO. 29 wherever the latter is grown. Cauvery [T (N) 1×TKM. 6] also possesses the above traits with earliness and finer grains. It is intended to replace TKM. 6 and can be grown whenever the latter is raised. Because of its earliness it can fit in well in the multiple cropping pattern of the different areas brought under irrigation.

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