

## **‘CoPant 05224’ – A Superior Alternative variety for Sugarcane Growers in Uttarakhand**

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India is major sugarcane growing country with production about 361 million metric tons from 5.04 million hectares. It is also an important cash crop of sub tropical India including Uttar Pradesh and Uttarakhand in North West zone. In Uttarakhand, sugarcane is being grown on 96 thousands hectare land with total production of 58.42 lakh ton of cane (2009-10) at an average yield of 60.9 tons per hectare. Cane and sugar productivity of Uttarakhand is low compared to other states like Maharashtra, Tamilnadu and Gujarat etc. With many other factors adversely affecting yield, cultivation of low yielding cane varieties is also a major factor which restrict optimum cane yield and sugar recovery in concerned area. In view of unavailability of suitable cane varieties for the region, the varietals improvement programme is being carried through All India Coordinated Research Project on Sugarcane at Pantnagar. Research efforts were made to identify high yielding and high sugared variety for varying sowing conditions prevailing in the area. The results of carefully planned hybridization programme followed by rigorous selection for high yield and sucrose percent in juice reflected in the form of improved varieties released for cultivation in the area. This paper is aimed to discuss one of the end products of such concentrated efforts and the salient features of the newly released variety ‘CoPant 05224’ (Plate 1).

A poly-cross was attempted taking ‘CoPant 84212’ as female at National Hybridization Garden, Sugarcane Breeding Institute, Coimbatore, Tamilnadu and the F1 progenies of the cross raised at NEB Crop Research Centre, G. B. Pant University of Agriculture and Technology. Clonal selection procedure was followed from the seedling nursery and the clone ‘CoPant 05224’ was selected. After evaluating performance at early clonal generations and in the station trials, this clone was proposed for testing in AICRP zonal varietal trials. A total of 35 trials were conducted at nine AICRP centers of North-western zone for plant and ratoon crops during 2008 to 2011 out of which 15 trials were conducted in Uttarakhand and Uttar Pradesh at four locations viz., Muzaffarnagar, Shahjahanpur, Lucknow and Pantnagar. All the recommended package of practices was followed for raising good crops. The juice quality test, at 300 and 360 days in plant crop and 330 days in ratoon crops, were conducted as per standard procedure (Meade and Chen, 1971). The morphological characters were



Plate 1 The crop of ‘CoPant 05224’ in October sowing (five months old crop)

observed as per standards explained by Dutt *et al.* (1947) at 12 month crop age (table 1). The reaction to red rot, wilt and smut was though observed in field conditions, rated under artificial conditions also.

The number of millable canes, cane weight and cane height were reported to be important cane yield contributing components (Mariotti 1987, Kumar *et al.* 2003, Belwal 2011, Joshi 2012). This cultivar had produced higher number of millable canes with superior cane weight, height, diameter and high sucrose accumulation compared to other entries. Mean performance of ‘CoPant 05224’ over the locations was discussed hereunder.

Table 1 Distinguishing features of newly released sugarcane variety Co Pant 05224.

S. No.	Character as per descriptor	Descriptor status
1.	Stool habit	Erect
2.	Stem colour-exposed	Blackish-white
3.	Stem colour-unexposed	Greenish-white
4.	Ivory marks	Present
5.	Weather marks	Present
6.	Internode shape	Cylindrical
7.	Internode alignment	Absent
8.	Pithiness	Absent
9.	Splits on internode	Absent
10.	Wax on the internode	Medium
11.	Node swelling	Swollen moderate
12.	Root zone colour-exposed	Creamish-white
13.	Root zone colour-unexposed	Yellowish
14.	No. of root eye rows	Two
15.	Arrangement of root eyes	In rows (Line)
16.	Bud size	Medium (1.0 cm)
17.	Bud shape	Triangular pointed
18.	Bud cushion	Present
19.	Bud germ pore position	Apical
20.	Bud groove	Present
21.	Growth ring colour	Yellow
22.	Leaf length	175 cm (153–191 cm)
23.	Leaf width	Broad 5.5 cm (5.3–7.0 cm)
24.	Lamina colour	Green
25.	Leaf carriage shape	Tip drooping
26.	Leaf sheath colour	Whitish-green
27.	Leaf sheath waxiness	Light
28.	Leaf sheath spines	Sparse
29.	Leaf sheath clasping	Medium
30.	Dewlap colour	Green
31.	Presence or absence ligular process	Present
32.	Shape of ligular process	Crescent shape
33.	Shape of auricles	Deltoid
34.	Percent of flowering	Nil

**Cane and sugar yield:** ‘CoPant 05224’ showed consistent performance for cane and sugar yield in plant and ratoon crops over the years and trials. This variety recorded average 9.85 t/ha commercial cane sugar (CCS) yield, which was 12.07%, 22.99% and 16.44% higher than checks ‘CoS 767’ (8.79 t/ha), ‘CoS 8436’ (8.01 t/ha) and ‘Co1148’ (8.46 t/ha), respectively (Table 2). Table 2 further revealed that ‘CoPant 05224’ surpassed all checks in multi-location trials conducted in north-west zone by a margin of more than 10% for cane yield. Mean cane yield of ‘CoPant 05224’ was recorded to be 80.21 t/ha, which is 11.36%, 30.78% and 15.51% higher than check ‘CoS 767’ (72.03 t/ha), Co S 8436 (61.33 t/ha) and ‘Co1148’ (69.44 t/ha), respectively.

**Performance for yield components:** The variety ‘CoPant 05224’ recorded good good germination (38.19%), high number of tillers (215 thousand/ha) and NMC (105 thousand/ha) over the years. ‘CoPant 05224’ recorded higher single cane weight (0.83-1.01 kg), cane height (198-234 cm) and cane thickness (2.22-2.31 cm) in different trials and years over the locations. On an average ‘CoPant 05224’ surpassed the best check by a margin of 18.5% for single cane weight (Table 2).

**Performance for juice quality parameters:** An overview given in table 2 indicated that ‘CoPant 05224’ recorded 11.23% and 12.36% commercial cane sugar or sugar recovery per cent at 10 and 12 months stage, which is at par with ‘CoS 767’ (11.37% and 12.33%), ‘CoS 8436’ (12.13% and 12.94%) and ‘Co 1148’ (11.10% and 12.49%). The sucrose percent in juice (16.39% and 17.91%) and juice purity (86.09% and 87.95%) of variety ‘CoPant 05224’ was found at par with checks at 10 and 12 month stage, respectively. The juice extraction percent of ‘CoPant 05224’ (51.64%) at harvest was marginally less than the checks, however, ‘CoPant 05224’ contained 17.74% fibre at harvest which is at par with the check ‘CoS 767’ (18.02%), ‘CoS 8436’ (17.64%) and ‘Co1148’ (17.35%).

**Performance of ratoon crop:** High cane yield (72.36 t/ha) of ratoon crop coupled with good sucrose in juice (17.44%) and high juice purity (87%) at 11 month indicated good ratooning ability of ‘CoPant 05224’.

**Reaction to diseases:** No disease was observed under field conditions in ‘CoPant 05224’. It was observed almost resistant against red rot disease under artificial inoculation by plug method at 11 different location / years. Similarly, ‘CoPant 05224’ exhibited resistant to moderately resistant reaction against red rot under nodal and cotton swab method at 8 and 4 different location / years, respectively. This variety was observed moderately resistant to wilt under field condition at Pantnagar.

**Distinguishing Characters:** ‘CoPant 05224’ could be easily identify by its blackish white stem colour in exposed conditions along with green broad leaves having sparse spines



Plate 2 Exposed stem colour (blackish-white) and Bud characteristics (Triangular pointed bud shape etc.) of ‘CoPant 05224’

Table 2 Summary of performance of 'CoPant 05224' in zonal varietal trials

Name of characters	Mean Performance			
	'Co Pant 05224'	'Co S 767'	'Co S 8436'	'Co 1148'
<b>Yield Attributes</b>				
Commercial cane sugar yield (t/ha)	9.85	8.79	8.01	8.46
Cane yield (t/ha)	80.21	72.03	61.33	69.44
No. of millable cane (000) per ha	104.59	107.69	95.60	116.35
Cane weight (kg)	0.93	0.79	0.75	0.72
Cane length (cm)	218.25	214.42	156.00	213.50
Cane diameter (cm)	2.26	2.11	2.47	2.08
No. of tillers (000) per ha	215	238	201	256
Germination percent	38.19	35.73	35.54	37.34
<b>Juice analysis at 300 days</b>				
Juice sucrose %	16.39	16.64	17.65	16.33
Commercial cane sugar %	11.23	11.37	12.13	11.10
Juice purity %	86.09	86.29	87.66	86.09
<b>Juice analysis at 330 days in ratoon and 360 days in plant</b>				
Juice sucrose %	17.91	17.89	18.88	17.78
Commercial cane sugar %	12.36	12.33	12.94	12.49
Juice purity %	87.95	87.88	87.83	87.82
Juice extraction %	51.64	50.49	55.55	55.48
Fibre % at harvest	17.74	18.02	17.64	17.35

on leaf sheath. The distinguishing bud characters can be seen in Plate 2.

#### CONCLUSION

This variety recorded heavier single cane weight, tall cane and higher cane diameter surpassing most of the checks. The variety was tested moderately resistant to red rot disease and found resistant to wilt under field conditions. On the basis of superiority in desired characters, the variety 'CoPant 05224' was released in mid-late maturity group and recommended for cultivation in Uttarakhand state by State Sugarcane Variety Release Committee of Uttarakhand. This variety was also identified for release in north-west zone by AICRP-Sugarcane workshop and may be recommended for commercial cultivation in Punjab, Haryana, Uttar Pradesh and Uttarakhand after on-farm testing in the farmers' field under different sugar factory areas.

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