Rice CO 55: An early maturing high yielding super fine rice variety

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CO 55 is a derivative of the cross, ADT 43 / GEB 24 and both the parents are noteworthy for grain quality and fineness. It matures in 110 – 115 days. This culture with semi dwarf stature has efficient tillering capacity, droopy panicles with highly acceptable plant characters and is a good replacement for the rice variety CO 51, ADT 53 and RNR 15048 fine grain with good cooking quality coupled with high yield. In the overall analysis, the culture, CO 55 recorded a mean productivity of 6057 kg/ha in seven years of trials with 7.00 and 15.31 per cent increase over ADT 53 and RNR 15048. It registered a mean grain yield of 6960 kg/ha in three years of station trials with an increase of 18.30 per cent over CO 51. CO 55 was evaluated in special MLT during 2020-21. In 2020-21, in short duration super fine special MLT, its mean grain yield was 5466 kg/ha.CO 55 was evaluated as IET 27873 under All India Coordinated Rice Improvement Programme during *Kharif* 2018 across the country in Initial Varietal Trial- Early. It recorded a mean grain yield of 4755 kg/ha with 9.30 percent increase over the national check CO 51. Under special ART / Summer 2021, this variety was tested in 72 locations in Tamil Nadu of which the culture recorded more than 6000 kg/ha in 34 locations. It recorded a mean grain yield of 5873 kg/ha which was 5.12 and 13.80 per cent higher than ADT 53 and RNR 15048 respectively. Under OFT during 2020-21, in one acre plot demonstration, the culture recorded a mean grain yield of 6996 kg/ha in 13 locations which was 17.19, 8.65 and 24.43 per cent higher than ADT 53, CO 54 and RNR 15048 respectively. CO 55 is moderately resistant to the disease RTD. It produces medium slender white rice with intermediate amylose content, soft gel consistency and moderate gelatinization temperature indicating its suitability for cooking with a remunerative market price and consumer preference as similar to that of BPT 5204 and RNR 15048 and it is suitable for cultivation during *Kar* / *Kuruvai* / *Sornavari* / *Navarai* seasons in Tamil Nadu.

Rice ADT 57: A short duration rice variety with high yield and good cooking quality

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In Tamil Nadu, out of 20.0 lakh hectare, annually about six to eight lakh hectares are covered with short duration rice varieties throughout the year in different growing seasons *viz*., *Kar, Kuruvai, Sornavari, Navarai, late Thaladi* and *Summer*. Short duration varieties such as ADT 36, ADT 37, ADT 43, ADT (R) 45, CO 51, ASD 16 and TPS 5 are widely cultivated in different regions based on their adaptability, market and consumer preferences. However, there is a need to release more number of short duration rice varieties to provide choice of varieties to the farmers and also to replace two to four decade old varieties. New rice variety, ADT 57, was developed through hybridization and pedigree breeding involving the parents ADT (R) 45 and ACK 03002. It is a semidwarf variety with a plant height of 92 to 104 cm has profuse tillering and erect plant habit. It matures in 115 days and highly suitable for seasons such as *Kar, Kuruvai, Sornavari, Navarai, late Thaladi* and *Summer* as a transplanted crop. On overall analysis in 11 years of testing in various yield trials, the culture AD 09219 recorded a mean grain yield of 6502 kg/ha with yield advantage of 15.3, 13.1 and 12.3 per cent higher than ADT 43, CO 51 and ADT 53 respectively. ADT 57 is resistant to blast and moderately resistant to sheath blight, brown spot, rice tungro, stemborer, leaffolder and brown plant hoppers. It possesses medium slender white rice with preferable milling (HRR – 60.6 %), cooking (KLA – 9.1 - mm, LER – 1.6 mm, BER – 1.4 mm and VER - 4.0 ml) and biochemical characters (soft gel, moderate gelatinization temperature and intermediate amylose). Based on the superior characteristics of such as high yield potential, resistance/moderate resistance to pest and disease and good milling and cooking properties in comparison to the checks ADT 43, CO 51 and ADT 53 it was released as a Rice ADT 57 during 2022 for cultivation during *Kar, Kuruvai, Sornavari, Navarai and Summer* seasons in Tamil Nadu.

Rice TKM 15: High yielding, short duration rice variety suitable for direct sown water limited areas of Tamil Nadu

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TKM 15 is a short duration, drought tolerant rice variety released from Rice Research Station, Tirur for direct sown rainfed and semidry areas of Tamil Nadu *viz.,* Kancheepuram, Chengalpattu, Tiruvallur, Pudukottai, Ramanathapuram, Virudhunagar, Sivagangai and Thoothukudi districts. It is a cross derivative of TKM (R) 12 and IET 21620. It matures in 118 days and has the ability to withstand early stage water stress, good germination percentage under direct sowing, early vigour and high drought recovery. This variety has manifested the average grain yield of 3995 kg/ha and 4217 kg/ha under rainfed and semidry conditions respectively in 116 trials conducted during the past ten years which was 10.42 per cent and 17.89 per cent increase over the check variety Anna (R) 4 in rainfed and semidry conditions. This culture was also nominated to All India Co-ordinated Rice Improvement Project (AICRIP) Trials and tested in Initial Varietal Trial-Early Direct Sowing (IVT-EDS) as IET 26645 during *Kharif,* 2017 and recorded grain yield of 3386 kg /ha in 115 days.

TKM 15 is erect, high tillering and non-lodging in plant habit, with dense droopy compact panicle (25 cm) having more number of grains per panicle (253 no.). It is moderately resistant to major diseases such as blast, sheath rot, sheath blight, brown spot and RTD and field tolerant to major pests like leaf folder, stem borer and gall midge which are its added advantage. It has good hulling (80%), milling (68%) and Head Rice Recovery (62.9 %) percentage. Rice is white and medium slender with 1000 grain weight of 15.0 g. TKM 15 has intermediate amylose content (21.60), soft gel consistency and high to intermediate gelatinization temperature and the cooked rice is non sticky with good taste. It has higher proline content (2.15 mg/g), Chlorophyll Stability Index (80.23 %) and total chlorophyll content (1.51 mg/g) under water stress. It has good germination percentage even after 15-20 days after sowing with the occurrence of rain, early vigour, tolerance to dry spell and the ability to recover fast with the receipt of rainfall after water stress. With high yield, drought tolerance potential and preferable medium slender grain quality, the variety TKM 15 meets the requirement of farmers in rainfed and semidry environments.

Rice TRY 5: An early duration high yielding rice variety suited for salt affected soils

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Farmer's foremost selection of technology to boost the yield will be the choice of suitable variety for the suitable season. Hitherto, in the problematic soil, this remains the important criteria and hence development of rice variety with earliness and tolerance to salt affected soil is very much needed. At present in different seasons *viz*, *Kuruvai* and *navarai*, farmers cultivate early duration rice varieties that are not suited to saline / sodic tracts or with lesser yield levels in the tolerant varieties like TRY 2. Hence farmers need a variety with early duration besides good cooking quality. In order to cater the needs of the farmers, Department of Plant Breeding and Genetics, Anbil Dharmalingam Agricultural College and Research Institute, Trichy developed an early duration sodicity tolerant high yielding rice variety, TRY 5, (a mutant of TRY 2).

This variety is well suited to *Kuruvai* / *Navarai* seasons, of Tamil Nadu maturing in 105-112 days with an average grain yield of 5113 kg/ha with an advantage of 12.64 per cent grain yield over TRY 2, 17.03 per cent over ASD 16, 16.70 per cent over ADT 45 and 21.35 per cent over ADT 53. Further evaluation in farmers field with salt affected soils has also revealed its superior performance and with good consumer preference. The culture is moderately resistant to blast, brown leaf spot, BPH, GLH and WBPH. Cooked rice is non sticky, soft with good flavor and taste and suitable for batter based products like idly and other table purposes because of its long slender type. The milling yield (68%) and head rice recovery (57%) of this variety are preferred by the stake holders.

Blackgram ADT 7: A high yielding blackgram variety suitable for rice fallow cultivation in Cauvery Delta Zone (CDZ)

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Pulses the prime source of high-quality vegetable protein of our food occupies 15 per cent area among food grains in India. Among them Blackgram the most preferred pulse is utilized in daily food preparations and values addition. In India Blackgram is grown in 44.78 lakh ha with a production of 28.32 lakh tonnes and average productivity is 632 kg/ha (Source: www.Indiastat.com,2016-17). In Tamil Nadu a total of 2.22 lakh tonnes of Blackgram is produced from 3.25 lakh ha with an average productivity of 684 kg/ha (Source: Season and Crop Report,2015-16)

In Cauvery Delta Zone (CDZ), Rice and Rice based cropping system occupies a major area supported by canal, borewell and rainfall as sources of irrigation. After Samba rice crop pulses are cultivated as “Rice Fallow Pulses” regularly from December second fortnight which is a unique system practiced in Cauvery Delta Zone (CDZ) comprising 2.29 lakh ha (25.86 per cent of total pulse area of 8.88 lakh ha) contributing a major share of pulse production in the state. (Source: Dept.of Agriculture Report, 2015-16).

Among rice fallow pulses Blackgram occupies an area of 1.38 lakh ha and the average productivity under rice fallow system is 431 kg/ha which is low compared to irrigated pure cropping system in CDZ. However, the major share of pulses in the state in terms of area and production comes from the CDZ districts viz, Thanjavur, Tiruvarur, Nagapattinam and parts of Trichy and Cuddalore Districts comprising 30.75 percent area and 29.55 percent production of the state. (Source: www.Indiastat.com,2016-17).

Focusing the importance of improving pulses productivity TRRI, Aduthurai had released the Blackgram culture AD(TR)BG14003 has Blackgram ADT 7 during 2022. It is a mutant of ADT 3 maturing in 65 to 70 days and suitable for rice fallow season. The average yield of the culture is 724 kg/ha which is 19.69 per cent increased yield over ADT 3 (606 kg/ha) and 10.53 per cent over ADT 6 (655 kg/ha). The culture is resistant to MYMV, leaf crinkle and stem necrosis; resistant to Stem fly and moderately resistant to pod borer and pod bug.

Blackgram ADT 7 has a hundred grain weight of 4.0 g and possess high protein (22.83%), starch (48.64%), crude fiber (2.63g), calcium (155 mg) and phosphorous (383 mg) with good battering quality and overall acceptance.

Greengram VBN 5: A new high yielding and MYMV disease resistant Greengram variety

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The high yielding Greengram variety VBN 5 (VGG 15-013) is derived from the cross VBN (Gg) 2 x ML 1451 and matures in 70 - 75 days. The average yield of VBN 5 is 878 kg/ha which is about 10.2 and 13.2 % increased yield over the two check varieties *viz.,* VBN 4 (797 kg/ha) and CO 8 (775 kg/ha) respectively. In station trials, it recorded a mean yield of 1002 kg/ha in *kharif* season and 1191 kg/ha in *rabi* season which is 18.3 (847 kg/ha) and 10.48 (1078 kg/ha) *per cent* increased yield over the check variety VBN (Gg) 3 and 35.5 and 21.4 *per cent* increased yield over CO 8. In multi location trials, it recorded the average yield of 746 and 977 kg/ha during *kharif* and *rabi* seasons respectively. The performance during *rabi* was good and the yield increase over the check variety CO 8 was 31.7 and VBN 4 was 16.2 *per cent*. In *rice fallow* MLT, it recorded yield of 778 kg/ha which is 19.9 *per cent* increase over the local check ADT 3. In Adaptive Research Trials during *kharif* season (46 locations), it recorded an average yield of 847 kg/ha with 9.0 *per cent* (777 kg/ha) and 7.8 *per cent* (786 kg/ha) increased yield over the check varieties VBN 4 and CO 8 respectively. In *rabi* seasons (44 locations), this variety recorded an average yield of 852 kg/ha, which is 10.5 (771 kg/ha) and 13.8 (749kg/ha) *per cent* increased yield over the check varieties VBN 4 and CO 8 respectively. In OFT trial conducted over 16 locations in Virudhunagar and Thoothukudi districts, this variety recorded grain yield of 941 kg/ha which is 10.6 *per cent* increased yield over VBN 4 (851 kg/ha). The unique characteristic of the new Greengram variety VBN 5 includes determinate plant type, medium duration with multiple blooming nature, resistance to Mungbean Yellow Mosaic Virus (MYMV) and Urdbean Leaf Crinkle (ULCV) diseases. The protein content of variety is 22.85 % and 100-seed weight is 3.5 - 4.0 g. This variety is recommended for cultivation during *kharif, rabi and summer* seasons of Tamil Nadu.

Groundnut VRI 9: High yielding groundnut variety

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Groundnut variety VRI 9 is a cross derivative of VG 0420 x VRI Gn 6. It is a medium duration (110-115 days) Spanish bunch groundnut variety released during 2022. VRI 9 groundnut is suitable for rainfed (Chithirai pattam, Adipattam, Aippasipattam) and irrigated (Margazhipattam and Masipattam) cultivation. In *Kharif* season, average dry pod yield of VRI 9 is 2526 kg/ha which is 13.3 and 14.1 *per cent* increase over TMV 14 (2230 kg/ha) and VRI 8 (2213 kg/ha) respectively. In *Rabi* season, average dry pod yield of VRI 9 is 2921 kg/ha which is 10.5 and 18.8 *per cent* superior over TMV 14 (2644 kg/ha) and VRI 8 (2459 kg/ha) respectively. It recorded a mean dry pod yield of 2095 kg/ha in Multi Location Trials (MLT), 2754 kg/ha in Adaptive Research Trials (ART), 3105 kg/ha in On Farm Trials (OFT). New groundnut variety VRI 9 is moderately resistant to late leaf spot (LLS) and rust diseases. VRI 9 is moderately resistant to sucking pests *viz*., Thrips, leaf hoppers and jassids as well as defoliators *viz*., Leaf miner, *Helicoverpa* and *Spodoptera.* 100 kernel weight is 45-50grams and shelling outturn is 70%. Oil content of groundnut VRI 9 is 47-49%. VRI 9 groundnut produced significantly highest dry pod yield of 2915 kg/ha at a spacing of 30 x 10 cm and 3076 kg/ha with enhanced dose of 125% of STCR.

Groundnut VRI 10: An early maturing bold seeded high yielding groundnut variety

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Spanish bunch groundnut variety VRI 10 is a derivative of the cross, VRI 2 / NRCG CS 349 was released during 2022. It is an early maturing groundnut variety matures in 90-95 days. VRI 10 groundnut variety is suitable for rainfed (Chithirai pattam, Adipattam, Aippasipattam) and irrigated (Margazhipattam and Masipattam) cultivation. During *Kharif* season, VRI 10 has performed well by producing 2535 kg/ha of dry pod yield which is 10.8 and 26.0 *per cent* superior over TMV 14 (2289 kg/ha) and GG 7 (2010 kg/ha) respectively. In *Rabi* season, VRI 10 registered an overall mean dry pod yield of 2448 kg/ha with 16.2 and 22.0 *per cent* increase over TMV 14 (2107 kg/ha) and GG 7 (2007 kg/ha) respectively. It recorded a mean dry pod yield of 2311 kg/ha in Multi Location Trials (MLT), 2602 kg/ha in Adaptive Research Trials (ART), 2157 kg/ha in On Farm Trials (OFT). New groundnut variety VRI 10 is moderately resistant to late leaf spot (LLS) and rust diseases. VRI 10 is moderately resistant to sucking pests *viz*., Thrips, leaf hoppers and jassids as well as defoliators *viz*., Leaf miner, *Helicoverpa* and *Spodoptera.* VRI 10 is a bold seeded groundnut variety having 100 kernel weight of 48-55grams, shelling outturn of 70-72% and 85-95% sound mature kernels. Oil content of groundnut VRI 10 is 46 - 48%.

Sugarcane COG 7: An early season, high yielding and high quality sugarcane variety

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The sugarcane variety CoG 7 is a hybrid derivative of the general cross of 89 V 74, suitable for the early season. It has a medium-thick cane with a high tillering ability and also has a high potential to convert more tillers to millable canes. It is moderately resistant to red rot and smut diseases and resistant to woolly aphids. It is a good ratooner. At Sugarcane Research Station, Melalathur under normal soil conditions, it recorded a plant cane yield of 138.37 t ha^{-1} and a sugar yield of 18.03 t ha^{-1}. Under ratoon, it recorded cane yield of 130.46 t ha^{-1} and sugar yield of 17.01 t ha^{-1} against the standard CoG 94077 with 122.34 t $ha^{-1}$of cane yield amounting to 15.69 t $ha^{-1}$of sugar yield in plant and 118.13 t $ha^{-1}$of cane yield leading to 15.18 t ha^{-1} of sugar yield in ratoon. In ART trials (2012-14 seasons), the CoG 7 also recorded an 18.04 percent increase in cane yield (134.94 t ha^{-1}) and a 19.52 percent increase in sugar yield (17.76 t ha^{-1}) compared to the check Co 86032.

The sugarcane variety CoG 7 was specifically tested in salt-affected soils in 20 locations with 60 trials as on-farm trials (OFT). Under salt-affected stress conditions, it recorded a higher cane yield of 129.98 tha^{-1} in plant and 122.24 tha^{-1} in ratoon as against the salt tolerant var. CoG 95076 with 96.16 tha^{-1} of cane yield in the plant, 93.25 tha^{-1} cane yield in ratoon, which works out to 35.19 % higher cane yield in plant and 31.08% higher cane yield in ratoon over CoG 95076. In sugar yield also, it recorded an overall mean of 16.93 tha^{-1} in plant and 15.90 tha^{-1} in ratoon, which is 38.81% and 34.82% increase over salt tolerant var. CoG 95076. This variety also recorded a 30.32% increase in cane yield, a 1.32% increase in CCS%, and a 37.49% increase in jaggery yield over the mega variety Co 86032 under salt-affected soil.

The sugarcane variety CoG 7 possesses superior jaggery qualities *viz*., juice recovery (60.0%), juice purity (90.87%), and jaggery recovery (10.92%).It recorded a higher jaggery yield of 14.19t ha^{-1} which is 37.10%, 44.94%, and 45.09% higher than standards *viz*., Co 86032 (10.35 t ha^{-1}), CoG 94077 (9.79 t ha^{-1}) and salt tolerant var. CoG 95076 (9.78 t ha^{-1}).

In nutshell, the sugarcane variety CoG 7 has been identified as a better-performing genotype in salt-affected soil. Due to the extraordinary performance of the variety in salt-affected soils and jaggery qualities, the sugarcane variety CoG 7 was released for commercial cultivation in 2022.