

Rice CO 54 : An early maturing high yielding rice variety

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CO 54 is a derivative of the cross, CB 04110 / CB 05501. It matures in 115 – 118 days. This variety with medium tall stature has efficient tillering capacity, long droopy panicles with highly acceptable plant characters and suitable for cultivation in *Sornavari / Kar / Kuruvai / Navarai* season. In overall analysis, CO 54 recorded a mean productivity of 6354 kg/ha in eight years of trials with 10.83 and 10.35 per cent yield increase over CO 51 and ADT 53, respectively. CO 54 was evaluated as IET 24313 under All India Coordinated Rice Improvement Programme during *Kharif* 2014 across the country in Initial Varietal Trial. It recorded a mean grain yield of 5505 kg/ha with 12.28 per cent increase over the national check IR 64. This variety is moderately resistant to BPH and diseases *viz.*, blast, sheath rot and brown spot. 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 ADT 43. CO 54 recorded a better agronomic efficiency than CO 51 and ADT 53, by registering more number of grains per panicle and higher grain yield. Nutrient use efficiency was also higher under 100% NPK / ha (150:50:50 kg /ha) when compared to higher graded level of nutrients (125 % of NPK/ha). It possesses higher physiological efficiency by registering higher crop growth rate, leaf area Index, better light transmission ratio, photosynthetic rate and dry matter production. CO 54 has early duration, higher yield, better pest and disease resistance and superior cooking quality was released during 2021 and suitable for cultivation as transplanted rice throughout Tamil Nadu during *Sornavari / Kar / kuruvai / Navarai* seasons and wherever early duration rice varieties are cultivated in Tamil Nadu.

ADT 55: Bacterial blight resistant rice variety developed through marker assisted selection

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Currently short duration varieties, ADT 43, ADT(R) 45, ASD 16 and CO 51 are widely grown in Tamil Nadu. None of the popular rice varieties either of short, medium or long duration are resistant to deadly disease of bacterial blight. Evolving high yielding rice genotypes with durable resistance to bacterial blight (BB) is pertinent considering the extensive damage caused by the disease in most of the rice growing regions. Though bacterial blight is controlled by various means, host plant resistance is considered to be the most effective, economical and environmentally safe option for management of the BB pathogen. Using high yielding BB susceptible rice variety ADT 43 popular among farmers and consumers and resistant donor IRBB 60 with three BB resistance genes *xa5*, *xa13* and *Xa21*, the rice variety ADT 55 was developed using functional marker assisted breeding. This variety (culture, AD (Bio) 09518) possesses all the three resistance genes (*xa5* + *xa13* + *Xa21*) and exhibited high levels of resistance against almost all the races (11 races) of *Xanthomonas oryzae* pv. *oryzae*. found suitable for cultivation as transplanted during Kar/Kuruvai/Sornavari/Navarai/Summer seasons of Tamil Nadu especially for BB hot spot areas. ADT 55 matures in 115 days, highly resistant to all the pathogenic races of bacterial blight, high yielding non-lodging, moderately resistant to blast, sheath rot and leaf folder. It produces medium slender white rice with acceptable physical and cooking quality traits. It was evaluated as IET 26770 under All India Coordinated Rice Improvement Programme during Kharif, 2017 across the country in Initial Varietal Trial – Early Transplanted. It recorded a mean grain yield of 4907 kg/ha which was 8.3 per cent over National check CO 51. The variety has recorded a mean grain yield of 5929 kg/ha in 170 locations which was 10.1 per cent yield increase over ADT 43 (5380 kg/ha). This is the first rice variety developed by TNAU using functional marker assisted breeding for BB resistance.

Rice TRY 4: A high yielding mid early duration rice variety for salt affected soils of Tamil Nadu

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Success for rice cultivation starts with the selection of appropriate varieties. Selection of variety is the low cost or no cost technology for a successful farmer. Delay in monsoon or insufficient rainfall periods in *thaladi* / *late thaladi* followed by *kuruvai* crop increases salinity / sodicity in soil. Under such situations, the choice of varieties is very much limited in the state. Even the cultivable rice varieties in these situations are not suited to salt affected tracts. But these are cultivated under compulsion resulting in reduced yield. Hence, farmers need a high yielding variety with mid early duration besides having fine grain and good cooking quality. To fulfill these objectives, efforts were taken at Anbil Dharmalingam Agricultural College and Research Institute, Trichy and identified a promising rice culture, **TR 05031**, a derivative of ADT 39 / CO 45 and released as **Rice TRY 4** during 2021. This variety is well fitted into Late *Samba* / *Thaladi*/ Late *Thaladi* seasons, of Tamil Nadu maturing in 127 days. The average grain yield of TRY 4 is 5730 kg/ha with an advantage of 22.00 per cent grain yield over TKM 13 and 16.50 per cent over ADT 39 in salt affected soils. The variety is eco-friendly as it possess multiple resistance to major pests *viz*, leaf folder and stem borer and to major diseases *viz*, blast and brown spot. Cooked rice is non sticky, soft with good flavor and taste and suitable for direct consumption. High milling yield (68.1%) and head rice recovery (57.2%) of this variety are preferred by the stake holders. Suitable for all affected patches of 11 districts in Tamilnadu namely Trichy, Ramanthapuram, Nagapattinam, Tiruvaur, Cuddalore, Tiruvallore, Thoothukudi, Tirunelveli, Krishnagiri, Dharmapuri and Salem during late *samba*/ *thaladi*/ late *thaladi* seasons.

A high yielding Ragi Variety : ATL 1

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Ragi variety ATL 1 (culture TNEc 1285) is a cross derivative of TNAU 900 x CO (Ra) 14 and released by Centre of Excellence in Millets, Athiyandal. It is an early duration culture and matures in 105 – 110 days. The average grain yield is 3128 kg/ha under irrigated and 2879 kg/ha under rainfed conditions. It has recorded an average yield of 3008 kg/ha in 269 trials conducted during the past eight years. This is 13.3, 16.2 and 17.1 per cent higher yield than the checks CO 15 (2656 kg/ha), Paiyur 2 (2588 kg/ha) and GPU 28 (2569 kg/ha), respectively. It recorded an average grain yield of 3183 kg/ha in the station trials, 2317 kg/ha in multi-location trials, 3004 kg/ha in adaptive research trials conducted by Department of Agriculture and 3061 kg/ha in ARTs conducted by KVK's. The mean straw yield is 4990 kg/ha, which is 13.7 per cent increase over the checks CO 15, 17.6 per cent over Paiyur 2 and 20.5 per cent over GPU 28.

Ragi ATL 1 has 8-9 incurved fingers per earhead and 5–6 productive tillers per plant. It is endowed with special attributes like easy threshability, synchronized maturity and non-lodging growth habit. Regarding the seed quality, it is rich in protein (11.9 %) and calcium (325 mg/100g) with the high flouing capacity (92 %) and low residual weight (8 %). Based on colour, appearance, flavor, texture and taste, Ragi ATL 1 displayed favourable overall acceptability. It is moderately resistant to leaf, neck and finger blasts. Though there is no major incidence of pests in ragi, the damages caused due to aphids, grasshopper, earhead caterpillar, weevil and stem borer are minimum and is within the economic threshold level.

In light of its good stability in yield across seasons and locations, high seed protein content and overall acceptability, Ragi ATL 1 is released for cultivation during *kharif* season as rainfed crop in Erode, Salem, Dharmapuri and Krishnagiri districts and as an irrigated crop during summer in Thiruvannamalai and Vellore districts of Tamil Nadu.

A high yielding Varagu Variety : ATL 1

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The varagu variety ATL 1 (culture TNPsc 176) is a pure line selection from DPS 63 and released by Centre of Excellence in Millets, Athiyandal. It matures in 105-110 days and recorded 2506 and 4394 kg/ha of grain and straw yield, respectively in a total of 223 trials under rainfed condition. The yield superiority observed is 12.5 and 13.8 per cent increase in terms of grain and 15.5 and 13.0 per cent increase in terms of straw yield over the check varieties, CO3 and TNAU 86, respectively. The grain and straw yield of the varagu culture TNPsc 176 in Adaptive Research trials is 2585 and 4489 kg/ha, in On Farm Trials is 2961 and 4955 kg/ha and Large Scale Demonstration is 3504 and 5649 kg/ha, respectively.

Varagu ATL 1 has strong and sturdy culm with regular, long and open panicles. The plant stature is medium tall and tufty. It is drought tolerant. The plant has 10-15 productive tillers and non-shattering grains. It is endowed with special attributes like easy threshability, synchronized maturity and non-lodging growth habit. The grains are bold and attractive light brown in colour. The grains are nutritious with preferred grain qualities for cooking and value addition. The nutrient rich straw is palatable and highly suitable for cattle feeding. With high bulk density and milling out turn, the proposed variety is preferred by consumers and entrepreneurs. Varagu ATL 1 is tolerant to shoot fly incidence and occurrence of grain smut and sheath blight diseases under field and controlled conditions.

Blackgram CO 7 : A high yielding bold seeded blackgram variety suitable for Tamil Nadu

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A high yielding blackgram variety CO 7 is a cross derivative of VBN (Bg) 5 x *V. mungo* var *silvestris* (22/10) and matures in 60 - 65 days. This variety recorded an overall mean yield of 881 kg/ha which is 12.1, 12.4 and 14.4 *per cent* increased yield over the check varieties *viz.*, CO 6 (786 kg/ha) , VBN 6 (784 kg/ha) and VBN 8 (770 kg/ha), respectively. In station trials, it recorded a mean yield of 997 kg/ha which is 14.3 *per cent* increased yield over CO 6. In Multi Location Trials (MLT), it recorded 790 and 709 kg/ha which is 10.3 and 13.9 *per cent* increased yield over the checks CO 6 and VBN 6 during *kharif* and *rabi* seasons, respectively. In Adaptive Research Trials (ART) conducted over 125 locations, it recorded an average yield of 850 kg/ha which is 6.4 and 6.8 *per cent* yield increase over the check varieties *viz.*, CO 6 (799 kg/ha) and VBN 6 (796 kg/ha). In OFT trials conducted over 37 locations, this variety recorded mean yield of 981 kg/ha which is 32 *per cent* yield increase over CO6 (743 kg/ha). In OFT trials conducted over 17 locations, this variety recorded mean grain yield of 878 kg/ha which is 14 *per cent* yield increase over VBN 8 (770 kg/ha). In AICRP- IVT trial conducted over 27 locations across India, it recorded mean grain yield of 916 kg/ha. This variety is resistant to yellow mosaic virus disease and moderately resistant to leaf crinkle and stem necrosis diseases. It has bold seeds with 100 seed weight ranging from 5.5 to 6.0 g. It is determinate plant type with synchronized maturity and suitable for single/mechanical harvest. It contains 22.3 *per cent* protein. It is recommended for cultivation during *kharif* and *rabi* seasons of Tamil Nadu.