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Notification and germplasm registration

Rice

Variety Pusa 1824

Pusa 1824 (IET 28442) is a high yielding mid-early duration rice variety with seed-to-seed maturity of 120-125 days and an average yield of 95.09 q/ha across two years of testing in the state of Delhi and National Capital Territory (NCT) area. The variety recorded 31.5% yield superiority over Pusa 44, most popular non-Basmati variety grown in this region and 23.9% yield superiority over IR64 in the Delhi state trial over two consecutive years of testing. It was developed from the cross, Pusa 44/PAU 201 through pedigree breeding at the Division of Genetics, ICAR-Indian Agricultural Research Institute, New Delhi. Pusa 1824 was identified for release in the NCT of Delhi by the State Seed Sub-Committee for Agricultural and Horticultural Crop, Govt. of Delhi on 28th December 2023, and subsequently released by the Central Sub Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops, Govt. of India and notified vide Gazette notification number S.O. 4388 (E) dated 8th October 2024 for commercial cultivation.

The variety possesses long slender (LS) grains with milled kernel length 5.97 mm, kernel breadth 1.66 mm, L/B ratio of 3.59, desirable ASV (5.5) and intermediate amylose content (24.9%) with very occasional grain chalkiness. It is semi-dwarf, high tillering, long semi-erect flag leaves and possesses sturdy stem owing to which it does not lodge. The panicles are completely exerted, non-shattering with awnless grains. The test weight of the grains is 24.75g. The variety owing to its early maturity, it can help timely harvest of paddy crop in the Delhi-NCT, which will also provide sufficient time for after-harvest operations. Timely clearing of fields will also help in reducing the environmental pollution and ensure timely sowing of the succeeding wheat crop.

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Variety Pusa 2090

Pusa 2090 (IET 29217) is a high yielding mid early duration rice variety with seed-to-seed maturity of 125-130 days with an average yield of 88.4 q/ha across two years of testing in the state of Delhi and National Capital Territory (NCT) area. It showed 22.3% yield superiority over Pusa 44, the most popular non-Basmati variety grown in this region. The variety also recorded 15.2% yield superiority over IR 64 in the Delhi state trial over two consecutive years of testing. It has been developed through pedigree breeding at the Division of Genetics, ICAR-Indian Agricultural Research Institute, New Delhi. It was derived from a cross between Pusa 44 and CB501, a breeding line from IIRON entries. Pusa 2090 was identified for release in the NCT of Delhi by the State Seed Sub-Committee for Agricultural and Horticultural Crop, Govt. of Delhi on 28th December 2023 and subsequently released by the Central Sub Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops, Govt. of India and notified vide Gazette notification number S.O. 4388 (E) dated 8th October 2024 for commercial cultivation

The variety possesses long bold (LB) grains with milled kernel length of 6.3 mm, kernel breadth of 2.4 mm, L/B ratio of 2.7, desirable ASV (4.0) and intermediate amylose content (23.6%) with very occasional grain chalkiness. It is semi-dwarf, possesses very sturdy stem, and non-lodging and non-shattering habit. Owing to its early maturity, it can help timely harvest of paddy crop in the Delhi-NCT area, which can also provide sufficient time for after-harvest operations. Timely clearing of fields will also help in reducing the environmental pollution and help in timely sowing of the succeeding wheat crop.

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Variety KKL (R) 3

Salt stress is a serious problem in irrigated agriculture and in coastal areas. In Cauvery deltaic regions of Tamil Nadu and Puducherry rice crop planted in *kharif/kuruvai* season (May-June) is severely affected by salinity due to irrigation of poor quality bore well water. As the presently grown salt tolerant rice varieties in this region are of medium/mid-early duration; they are not suitable for planting during this season, where short duration rice varieties maturing in <110-115 days are suitable. This warranted the need of early maturing, salt tolerant and high yielding rice varieties suitable for planting in *kharif/kuruvai* season.

KKL (R) 3 was bred under IRRI's Stress Tolerant Rice for Africa and South East Asia (STRASA) Project and the DBT network initiative aiming for the development of stress tolerant rice varieties through Marker Assisted Breeding targeting major genes associated with drought, submergence and salt tolerance. KKL (R) 3, tested as IET 27807 (KR 15066), is a cross derivative of ADT 45/FL 478 developed through combined MAS where in phenotyping in hydroponics (for seedling stage tolerance) is combined with application of molecular markers linked to salt tolerance genes notably saltol on Chromosome 1 (RM 3412 & RM 472) and on Chromosome 3 (D9/10 & D13/14).

KR 15066 was nominated for testing in the All India Coordinated Rice Improvement Project (AICRIP) trials, conducted from 2018 to 2022 across 45 locations, encompassing 33 sites under alkaline conditions and 12 under inland salinity. It was evaluated alongside national early check CSR 10, zonal check CSR 36, and various local check varieties of different durations. In alkaline environments, KKL (R) 3 recorded grain yield of 3500 kg/ha (pH: 9.8, EC:1.2dsm-1) with an yield advantage of 15% over CSR 10. In normal (stress-free) conditions KKL (R) 3 recorded an average grain yield of 6420 kg/ha. This variety exhibited tolerance to gall midge, moderate resistance to stem borer and leaf folder, as well as moderate resistance to neck blast and sheath rot. It possesses long bold grains with 1000 grain weight of 27.07g, along with commendable traits such as high milling (67%), superior head rice recovery (61.3%), amylose content of 27.15%, and a soft gel consistency measuring 41mm

This variety KKL (R) 3 has been approved for release by the Central Sub-Committee on Crop Standards for Agricultural Crops (CVRC), Government of India, in its 91st meeting for the states of Puducherry, Tamil Nadu and Haryana and notified via Gazette Notification Part II- Sec.3 (ii) No. 1479, S.O. No. 1560(E) dated 26.03.2024. The introduction of early maturing and salt-tolerant variety, KKL (R) 3) is likely to boost rice productivity in salt-affected regions.

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Maize

Variety DOP-339 (Pant Composite Maize 4)

In 2023, India's maize production was estimated at approximately 35.67 mt with a bumper productivity of 3100kg/ha. India ranks among the top maize producers globally. It is significantly contributing to domestic supply for internal consumption and may be sufficient for export to needy countries. But, the demand of maize is expected to increase with the increasing population and utilization maize for bioethanol production. Thus, there is a continuous need of developing high yielding cultivars for areas with adequate support of input and also in the areas such as North Hill Zone where maize is not cultivated commercially so far. Total maize production of the country can be increased by expanding areas as well as developing suitable cultivars with adequate seed feeding. Pantnagar has contributed significantly in Indian maize programme by developing many high yielding composites/open pollinated varieties, tolerant to major diseases and adapted to different climatic

conditions. Seeds of these composites have always been in high demand because of the high yield and adaptability. In the continuation of our scientific exercise, GBPUAT, Pantnagar has recently developed a variety for North Hill Zone, which was released by the Central Sub Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops, Govt. of India vide notification number of S. O. 1560 (E) dated 26/03/2024.

Pant Composite Makka 4 (DOP-339), an open pollinated variety, was produced by a population improvement strategy using local/landrace varieties collected from Chakrata Block in Dehradum district, Uttarakhand. To improve yield potential and multiply the seed of DOP-339, one cycle of phenotypic recurrent selection was performed followed by random mating. The source population for development of open pollinated variety DOP-339 included DLR 1 (Chakrata Makka 1), DLR-1 (Chakrata Makka 2), DLR-1 (Chakrata Makka 3) and DLR-1 (Chakrata Makka 4) collected from Chakrata block of Dehradun (Uttarakhand). Area of adaptation for Pant Composite Makka 4 (PCM-4) is Northern Hill Zone (Zone I) comprising of Jammu & Kashmir, Himachal Pradesh, Uttarakhand (Hills) and NE Hill Region (Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura). The plant height is 210-230cm and it matures early in about 90-95 days producing yellow flint grain quality and is suitable for growing in both timely and late sown conditions.

The variety DOP-339 demonstrated significant superiority over standard varieties such as Vijay, Bajoura Makka and Hemant in terms of yield and adaptability across multiple years (2020-2024) and trials in the Northern Hills Zone (NHZ-I). It recorded an average grain yield 5884 kg/ha over three years of in NHZ (Zone-I) as compared to checks, Bajaura Makka, Hemant and Vijay which gave 4630, 4737 and 4855 kg/ha, respectively. It was also tested under different planting densities and nutrient levels showing remarkable adaptability. The variety is most responsive to 100% RDF at density of 60 x 20cm in NHZ for high grain and Stover yield. DOP-339 possessed moderately resistant response to TLB and BLSB under artificial inoculation in NHZ (Zone-I). DOP-339 showed infestation average score of 4.64 on 1-9 scale against Chilo partellus. Against the Fall Army Worm, the variety DOP-339 showed mean Davis scores of 4.95 and 3.07 on whorl feeding injury and ear damage score at harvest, respectively.

The proposed variety DOP-339 also had high Stover yield and established superiority varied from 16.99 to 25.98% over check Bajaura Makka and 10.80 to 11.62% over qualifying variety KDM 30 across the normal and high density, and 100RDF and 150% RDF, respectively. Thus, the variety DOP-339 is also good for dry maize forage purpose.

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Chickpea

Variety RKGM 20-1 (Kota Desi Chana 2)

A new high yielding desi chickpea variety, RKGM 20-1 (Kota Desi Chana 2) has been developed by Agricultural Research Station, Kota (Agriculture University, Kota). The variety has been derived from the cross between GL 28143 and GJG 0918. Based on the yield performance in station trials, RKGM 20-1 was included in the All India Coordinated testing programme during 2020-21 in IVT trials for testing across multi-locations. Based on its yielding ability and disease resistance, it was released by the Central Sub Committee on Crop Standards, Notification and release of Varieties for Agricultural Crops, Government of India and notified vide S.O. 1560(E) dated 26th March, 2024 for commercial cultivation under timely sown, irrigated conditions of South Zone (SZ) comprising of Andhra Pradesh, Telangana and Karnataka. It gave an average yield of 20.72 q/ha under three years of testing in coordinated trials with yield potential of 29 q/ha. On weighted mean basis, it out yielded the checks viz., GBM 2, JG 11 and NBeG 47 by 10 to 15%. Out of a total nine locations during three years of testing in coordinated trials conducted under AICRP on Rabi Pulses (Chickpea), variety RKGM 20-1 appeared superior seven times as against six, one and four times, respectively over the check varieties GBM 2, JG 11 and NBeG 47.

The variety RKGM 20-1 is medium tall, producing erect to semi erect plants showing less lodging and thus, suitable for mechanical and quick harvesting hence reducing the cost of cultivation. It bears single purple flowers and pods, angular, rough, light brown, medium bold seed. The range of days to 50 per cent flowering is 44-49 days, while maturity period is about 95 days depending upon the locations and production conditions. The plant height recorded is 35.87 cm with 100-seed weight of 24.73g. The variety showed high nodulation, nodule weight and leghaemoglobin content over the checks. This variety is resistant to wilt, dry root rot, collar rot and stunt diseases and show lesser pod damage and larval population of *Helicoverpa armigera*. The variety RKGM 20-1 has been registered in NBPGR, New Delhi as germplasm (IC0642483). This elite variety with high yield potential, disease resistance and amenability to mechanical

harvesting may be a good option for varietal replacement to raise the chickpea productivity in South Zone.

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Variety RKGM 20-2 (Kota Desi Chana 3)

A new high yielding, desi chickpea variety RKGM 20-2 (Kota Desi Chana 3) has been developed by Agricultural Research Station, Kota (Agriculture University, Kota), Rajasthan. It is derived from the cross between 'GJG 0731' and 'Phule G 00108'. Based on the yield performance in station trials, RKGM 20-2 was evaluated in the All India Coordinated testing programme during 2020-21 in IVT for testing across the agro-climatic zones. Based on its overall performance in terms of yield and resistance to diseases, it was identified by the Variety Identification Committee (Rabi Pulses) meeting held on September 01, 2023. Consequently, the variety was released by the Central Sub Committee on Crop Standards, Notification and release of Varieties for Agricultural Crops, Government of India and notified vide S.O. 1560(E) dated 26th March, 2024 for cultivation under timely sown, irrigated conditions of North East Plain Zone comprising of eastern Uttar Pradesh, Bihar, Jharkhand, West Bengal and Assam. It recorded an average yield of 15.57 q/ha over three years of testing in coordinated trials with yield potential of 25.00q/ha. On weighted mean basis, it out-yielded the existing checks, namely, BG 3043, GNG 2207 and HC 5 by 14 to 18 per cent, respectively. Out of a total of twelve locations during three years testing in coordinated trials conducted under AICRP on Chickpea, variety RKGM 20-2 showed superiority four times as against one and two times over the check varieties, GNG 2207, BG 3043 and HC 5.

The variety RKGM 20-2 has medium tall, semi erect plants suitable for mechanical and quick harvesting hence reducing the cost of cultivation. It bears purple flowers and single pods, light brown, angular, rough, medium bold seed. The range of days to 50 percent flowering is 78-88 days with the mean of 83 days, while maturity period is about 128 days with the range of 126-132 days depending upon the locations and production conditions. The average plant height recorded is 58 cm with the range of 51-63 cm and 100-seed weight of around 26.83g. The variety showed high nodulation, nodule weight and leghaemoglobin content over the checks. This variety is resistant to wilt, dry root rot, collar rot and stunt diseases and show lesser pod damage and larval population of *Helicoverpa armigera*. The grains of this variety contain 20.25 % protein. The variety RKGM 20-2 has been registered in NBPGR, New Delhi as germplasm (IC0642484). Hence, this elite variety with high yield potential, resistance to major diseases and amenability to mechanical harvesting may be a good option for varietal replacement to raise the chickpea productivity in North East Plain Zone.

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Nandyal Gram 857 (NBeG 857)

Chickpea (*Cicer arietinum* L.) is an important pulse crop worldwide that contributes 34% and 49%, respectively to the total area and production of pulses in India. The chickpea crop is of immense economic and nutritional value. The major producing states of chickpea are Madhya Pradesh, Maharashtra, Rajasthan, Karnataka, Andhra Pradesh and Uttar Pradesh. The primary objectives of chickpea breeding are high seed yield with resistance to major diseases and insect pests. The appearance and quality of the harvested product of chickpea is also very important to fetch good price for its produce. A new high yielding chickpea variety Nandyal Gram 857 has been developed by the Regional Agricultural Research Station (RARS), Acharya N.G Ranga Agricultural University (ANGRAU), Nandyal, Andhra Pradesh as a main centre for All India Coordinated Research Project on chickpea (AICRP). This variety was derived from the cross ICC 12419 (female parent) x JG 11 (male parent) using pedigree selection method. The initial cross was made at the International Crop Research Institute for Semi-Arid Tropics (ICRISAT), Hyderabad and subsequent selections were alternately carried out at ICRISAT, Hyderabad and RARS, Nandyal. Based on the yield performance in station trials, NBeG 857 was included in All India Coordinated testing programme during 2018-19 in the Initial Varietal Trails (IVT) for testing over multi-locations. It had consistently out-performed the national and zonal check varieties during 2018-19 to 2020-21.

The chickpea variety Nandyal Gram 857 gave an average seed yield of 1803 kg/ha and showed yield superiority by 14.7 % and 20.8 % over checks viz., JAKI 9218 (1587 kg/ha) and JG 11 (1507 kg/ha), respectively in Southern Zone of India. Out of a total of 13 locations during three years of testing in coordinated trials conducted under AICRP on chickpea, it performed well over eight locations in Southern Zone. Under agronomy trials (adaptability trials) conducted under AICRP, it had yielded 1700 kg/ha, which showed yield superiority of 11.95 % and 31.88 % over checks viz.,JAKI 9218 (1807 kg/ha) and JG 11 (1534 kg/ha), respectively in AVT-II trail conducted over five locations of Southern Zone such as Coimbatore, Kalaburagi, Lam, Nandyal and Vijayapura during 2020-21. The variety Nandyal Gram 857 has recorded

a high level of resistance (10 R and 11 MR) to Fusarium wilt at locations during 2018-21 in comparison to check varieties JG 11 (5R and 5MR) and JAKI 9218 (5R and 6MR) in AICRP trials (IVT, AVT I and AVT II). It has also shown moderate resistance against dry root rot, collar rot and stunt and exhibit lesser pod damage and larval population of Helicoverpa armigera. Based on its yield stability, chickpea variety NBeG 857 was identified during the virtual Annual Group Meet of AICRP on Chickpea held on 16-17th August, 2021. The Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops, Government of India, released and notified this new variety under Notification No. S.O. 8(E), Dated 24.12.2021. It was released and notified for commercial cultivation under rainfed conditions in the Southern Zone of India comprising Andhra Pradesh, Karnataka and Tamil Nadu.

This new variety Nandyal Gram 857 matures with a range of 95-100 days (average 92 days) depending on the location and growing conditions. Nandyal Gram 857 is medium-tall (44.6 cm) with semi-spreading plant type (branches at 25-60 degrees from vertical) and with attractive light brown seeds. The coloration of the stem anthocyanin is present. The leaf size and pattern are both small and compound. The number of peduncles is one, and the length of the peduncles is short. The pod size and number of seeds are both small and numerous. The seed size, texture, ribbing, and type are described as small, angular, rough, present and desi type, respectively. It takes 43minutes to cook the dhal. The grains of this variety contain 21.7 % protein. Hence, this elite variety with high yield potential with multiple disease resistance may be a suitable replacement of existing old varieties to raise the chickpea productivity.

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Bt cotton

Variety Yugank Bt (CICR-H Bt Cotton 60)

Bt cotton was developed as a safer alternative to hazardous insecticides for managing bollworm in cotton. Despite over 90% of cotton area being under Bt hybrids, India's cotton productivity remains low, stagnating around 500 kg lint/ha, well below the global average of over 750 kg/ha. One of the reasons attributed to this productivity stagnation is deployment of Bt technology in the form of Bt hybrids in rainfed (low input) conditions which accounts to more than 60% of cotton area in India. Majority of the popular Bt hybrids are long duration that suffer moisture stress at boll formation stage due to poor water retention of shallow soils in rainfed regions. Bt varieties provide higher yields with an option of high-density planting, provide better protection against bollworms owing to presence of transgene in homozygous conditions with no further segregation, are less input demanding and more climate resilient. Seed of varieties can be saved for re-use next year. With more than 60% of cotton area in India is under rainfed conditions, Bt varieties can help India achieve better productivity, profitability and sustainability of cotton production especially in rainfed regions and on marginal soils.

An early maturing, compact Bt cotton variety (Yugank Bt) was developed from a four-way cross (Bikaneri Narma Bt × RCRSC7) × (RCRSC2 × RCRSC12) through pedigree method of breeding at ICAR-CICR, Nagpur. Presence of Bt gene across the generations was monitored through Cry1Ac - ELISA. Selection for traits of interest was exercised in regular kharif season at ICAR-CICR, Nagpur while rapid generation advancement was achieved at ICAR-CICR Regional Station, Coimbatore. The homozygosity in the stabilized lines was confirmed through zygosity PCR for cry1Ac gene. The Bt cotton variety Yugank Bt was identified in 88th meeting of Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops held on 17th June 2022 vide gazette notification S.O. No. 4065(E) dated 31stAugust 2022 (S. No. 176). Based on its exceptional performance in ICAR-AICRP on Cotton Trials for 3 years (2019-20, 2020-21 and 2021-22), this variety was approved for commercial cultivation under rainfed conditions of central zone comprising of Maharashtra, Madhya Pradesh and Gujarat states. It is a medium staple Bt cotton genotype which is tolerant to jassids, a major sucking pest on cotton, early in maturity (140-150 days), suitable for high density planting system (HDPS) and mechanized harvesting of cotton. Yugank Bt variety gave an average yield of 12.65 q/ha of seed cotton across 18 locations evaluated over 3 years. The variety has a potential yield of 22.1 q/ha, recorded at Surat during AET1 (2020-21) under closer spacing. Its yield superiority of 17.43% over non-Bt zonal check, 34.06% over

Bt zonal check and 36.39% over non-Bt local check showed an advantage. Average boll weight of this variety is 3.4 grams with a potential (attainable) boll weight of 3.8 grams obtained at Nanded during AET 2 (2021-22). This medium staple Bt cotton variety has a mean fibre length of 24.8 mm and mean fibre strength of 25.7 g/tex across locations and years. The potential fibre length of this variety is 25.8 mm recorded at Nagpur and Surat during AET 2 (2021-22) and potential fibre strength of 28.5 g/tex recorded at Akola during AET 1 (2020-21).

This new variety recorded a seed index of 7.8 gram with a potential seed index of 9.9 g obtained at Bharuch during AET 1 (2020-21). This variety has exceptional ginning out turn (GOT) of 38.1% with the potential of 43.9% recorded at Nagpur during IET (2019-20). It produces compact plant architecture with an average of <1 monopodia for plant and an average of 73.43 bolls for square meter indicating its amenability to high density planting system (HDPS). With higher cry toxin production, this variety provided 99% mortality of American bollworm (Helicoverpa armigera) when tested through bioassay of leaf, square and flower. Experiments at ICAR-CICR have revealed that an early maturing variety can potentially escape pink bollworm damage, a major insect pest which appears late in the season. This new Bt cotton variety tolerant to sucking pests, compact in plant architecture and early in maturity with higher GOT and yield superiority can contribute to increasing the productivity in rainfed conditions of central zone of India.

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Variety Samrat Bt (CICR-H Bt Cotton 63)

Cotton is an important commercial crop for India, as it is the largest producer and exporter of cotton in the world. The cotton industry provides employment to millions of people across the country, including farmers, laborers, and textile workers. Cotton cultivation has a significant impact on India's economy. India adopted Bt cotton technology through hybrids to combat bollworms, but despite covering over 90% of cotton cultivation, productivity remains low due to the extensive use of these hybrids in rainfed areas. Shifting focus to Bt cotton varieties, which offer higher yields, lower input requirements, and better climate resilience, could significantly improve productivity and sustainability in India's cotton production. In this endeavour, a medium staple Bt cotton variety, Samrat Bt (CICR-H Bt Cotton 63) tolerant to jassids (major sucking pest on cotton), early in maturity (140-150 days), suitable for high density planting system (HDPS) and mechanized harvesting was developed at ICAR-CICR, Nagpur. This Bt cotton variety (Samrat Bt) was developed from a four-way cross (Bikaneri Narma Bt × RCRSC7) × (RCRSC2 × RCRSC12) through pedigree method of breeding where the presence of Bt gene across the generations was monitored through Cry1Ac - ELISA. Selection for plant architecture, jassid tolerance, earliness, yield and fibre quality was exercised in regular kharif at ICAR-CICR, Nagpur while segregating generations were advanced through an off-season crop at ICAR-CICR Regional Station, Coimbatore. The homozygosity of Bt gene (cry1Ac) was confirmed through zygosity PCR.

The Bt cotton variety Samrat Bt was identified in 88th meeting of Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops held on 17th June 2022 under the Chairmanship of DDG Crop Sciences, based on its exceptional performance in ICAR-AICRP on Cotton Trials for 3 years (2019-20, 2020-21 and 2021-22). The variety was approved for commercial cultivation under rainfed conditions of south zone (for the states of Karnataka, Telangana, Andhra Pradesh, and Tamil Nadu) through a gazette notification vide S.O. 4065(E) dated 31st August 2022 (S. No. 179). This variety has yielded an average of 13.73 quintals per hectare of seed cotton across 25 locations of south zone over 3 years. Samrat Bt recorded highest yield of 24.14 quintal per hectare at Mudhole during IET (2019-20). It produced yield superiority of 80.56% over Bt zonal check and 3.94% over non-Bt local check. Average boll weight of this variety is 3.7 grams with a potential attainable boll weight of 4.7 grams recorded at Adilabad during AET 2 (2021-22). This medium staple Bt cotton genotype has a mean fibre length of 25.17 mm and mean fibre strength of 25.1 g/tex across locations and years. The potential fibre length of the variety is 27.0 mm recorded at Perumbalur during IET (2019-20) and potential fibre strength of 27.6 g/texrecorded at Adilabad during IET (2019-20). It has mean seed index of 9.07 gram. This Bt variety has very good ginning out turn (GOT) of 36.77% with the potential of 42.0% recorded at Dharwad during IET (2019-20).This is compact in plant architecture with an average of less than 1 monopodia for plant with average of 70.32 bolls for metre square indicating its amenability to HDPSand mechanized harvesting. The proposed variety combines good tolerance to pest and diseases and the farmers will be highly benefitted by cultivating this genotype.

With early maturity, Samrat Bt can help to Indian cotton farmers to escape from damage of pink bollworm, terminal drought stress and also provide an opportunity for taking up second crop. This new Bt cotton variety tolerant to jassids, compact in plant architecture and early in maturity with higher GOT and yield superiority can contribute to increasing the productivity in rainfed conditions of South zone of India.

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Soybean

Variety Pusa Soybean 21 (DS9421)

Soybean (*Glycin max* L.) is the *numero uno* oilseed crop of India. It is grown nearly in 12 mha with an annual production of about 13 mt. It contains 18-20% oil and 40-45% protein. The soybean oil is considered as human health-friendly as it contains less saturated fatty acids and more mono- and poly-unsaturated fatty acids. Similarly, the quality of the soy-protein is also considered as the best as it contains nearly all the amino acids that are essential for human health. However, the soybean seeds contain some anti-nutritional factors amongst which Kunitz Trypsin Inhibitor (KTI) is the prime one. Although heat treatment can reduce its content to a greater extent, but not completely. Further, the heat treatment effects the solubility of the soy-protein besides involving extra costs for heat treatment. So, we attempted genetic elimination of KTI from a popular soybean variety of North India i.e. DS9712 and developed its improved version (Pusa Soybean 21 or DS9421) with zero KTI, which was released for commercial cultivation in the National Capital Territory (NCT) of Delhi by the Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops vide Order No.3-87l2024-SD. IV Dated September 04, 2024 and Gazette notification number S.O. 4388(E) dated 8th October 2024

The Pusa Soybean 21 is a specialty soybean variety, which is free from Kunitz Trypsin Inhibitor (KTI), which is unsuitable for human and animal health. It was introgressed with the null allele i.e., kti from the donor genotype PI542044, which made it free from the KTI. It is the first ever specialty soybean variety of North India, which was developed through molecular marker-assisted backcross breeding (MABB) approach. On three years of testing, on average Pusa Soybean 21 yielded 1229.31 kg/ha as against 1221.34 kg/ha of DS9712, the recurrent parent variety (check variety). However, it yielded as high as 1405 kg/ha in the Delhi state trial. It is best for medium to high fertile soil of the NCT-Delhi and suitable to grow under irrigated, timely sown condition during *kharif*.

Phenotypically, the Pusa Soybean 21 has a determinate growth habit with average plant height of 55 cm. It has grey pubescence, white flower with 2-3 seeded pods. The seeds are medium-bold, yellow, lustering with black hilum. It has good seed germination (>80%) that allows maintaining good crop stand in the field leading to higher production. It has higher content of protein 33.14 % (31-36.9%) and oil 20.19% (18-23.69%). It has non-lodging and non-shattering habit with very sturdy stem.

The Pusa Soybean 21 has resistance against major diseases such as Yellow Mosaic Virus (YMV), Soybean Mosaic Virus (SMS) and Bud Blight (BB), and it is moderately resistant to the insect pest stem fly (*Ophiomyia phaseoli*). The Pusa Soybean 21 has over all low Trypsin Inhibitor (TI) activity (14.19 mg g^{-1}) as against the recurrent parent DS9712 (83.37 mg g^{-1}). It matures in about 113 days (110-117 days) as against 118 days (113-120 days) of DS9712. Owing to its early maturity, it would offer extra time to the farmers for clearing and making the fields ready for the next crop. It is best for human and animal consumption and suitable to use in industry for soy-based food production. Thus, it will benefit the farmers with higher yield, quality soy meal and better price of the products.

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Linseed

Variety Sabour Tisi-3

A new high yielding variety of linseed Sabour Tisi-3 (BRLS 107-1) has been developed by Bihar Agricultural University, Sabour, Bhagalpur (Bihar) under AICRP on linseed. This variety was developed from the cross, LCK 7035 x Shekhar following pedigree selection method. It was evaluated consequently for three years from 2015-16 to 2017-18 at Bihar Agricultural College, Sabour and named as BRLS 107-1. The genotype BRLS 107-1 was entered in IVT-Utera under All India Coordinated Research Project (AICRP) on linseed during 2018-19 and evaluated at multi-location viz., Waraseoni (Madhya Pradesh), Raipur (Chhattisgarh), Keonjhar (Odisha), Shilongini (Assam), Kanke (Jharkhand), Nagpur (Maharashtra) and Sabour (Bihar). It gave an average seed yield of 573 kg/ha and showed yield advantage of 15.8 % and 6.1 % over T 397 national check (495 kg/ha) and RLC 143 zonal check (540 kg/ha), respectively. Similarly, it gave average oil yield 239.5 kg/ha and with advantage of 48.9 % and 49.3 % over T 397 national check (160.9 kg/ha) and RLC 143 zonal check (160.4 kg/ha), respectively, and oil content of this variety was 41.8 % and with advantage of 28.6 % and 40.7 % over T 397 national check (32.5 %) and RLC 143 zonal check (29.7%), respectively. Based on its significant superiority in yield over the check, it was promoted to Advanced Varietal Trial I (AVTI) under Utera condition for Zone II & III of India. In AVT, it gave an average seed yield of 589 kg/ha and showed yield advantage of 36.7 % and 18.3 % over T 397 national check (431 kg/ha) and RLC 143 zonal check (498 kg/ha), respectively. Similarly, it gave average oil yield 200.8 kg/ha and with advantage of 101.6 % and 86.6 % over T 397 national check (99.6 kg/ha) and RLC 143 zonal check (107.6 kg/ha), respectively, and oil content of this variety was 34.1 % and with advantage of 47.6 % and 57.9 % over T 397 national check (23.1 %) and RLC 143 zonal check (21.6 %), respectively. In AVT II, the genotype, BRLS 107-1 gave an average seed yield 466 kg/ha and showed yield advantage of 13.1 % and 8.6 % over T 397 national check (412 kg/ha) and RLC 143 zonal check (429 kg/ha), respectively. Similarly, it gave average oil yield 251.2 kg/ha and with advantage of 90.6 % and 40.2 % over T 397 national check (131.8 kg/ha) and RLC 143 zonal check (179.2 kg/ha), respectively, and oil content of this variety 36.4 % and with advantage of 28.2 % and 14.1 % over T 397 national check (28.4 %) and RLC 143 zonal check (31.9 %), respectively. Overall, it showed superiority in seed yield, oil yield and oil content in multi-location Advanced Varietal Trials during 2019-20 and 2020-21. Based on seed yield and oil yield with superiority of 22.10% and 61.11% over the national check T397, respectively, it was identified during Annual Group Meeting of Safflower and Linseed held at ICAR-IIOR, Hyderabad on 18th August, 2021. Subsequently BRLS 107-1 (Variety Sabour Tisi-3) was released and notified Crops, by the Central Sub-Committee on Crop Standard Notification and Release of Varieties for Agricultural Crops, Govt. of India vide Gazette notification number SO.8/(E), dated December 24, 2021 for commercial cultivation in the states of Uttar Pradesh, Bihar, Jharkhand, West Bengal, Assam, Nagaland, Madhya Pradesh, Rajasthan, Maharashtra, Chhattisgarh, Odisha and Karnataka. The nucleus seed of Sabour Tisi-3 has been submitted to NBPGR, New Delhi and assigned the National Identity Number of IC639868.

To summarize the results of three years' evaluation, the detailed description showed that the average seed yield recorded was 547 kg/ha, which displayed superiority of 22.1%, 11.2%, 65.3% and 21.0% in yield over the controls, T 397 (448 kg/ha), RLC 143 (492 kg/ha), BAUP101 local check (331 kg/ha) and RLC 153, latest release variety (452 kg/ha), respectively. Further, oil yield was 232.1 (kg/ha) with advantage of 70.4 %, 53.6 %, 279.2 % and 25.6 % over T397 (136.2 kg/ha), RLC 143 (151.1 kg/ha), BAUP101 local check (61.2 kg/ha) and RLC 153 latest release variety (184.8 kg/ha), respectively. Similarly, oil content was 38.2 % with superiority of 32.6 %, 35.9 %, 77.7 % and 17.2 % over T397 (28.8 %), RLC 143 (28.1 %), BAUP101 local check (21.5 %) and RLC 153 latest release variety (32.6 %), respectively. This variety was resistance to wilt and powdery mildew and moderately resistance to rust.

The variety Sabour Tisi-3 flowers in 67 days and matures in 118 days producing 19 capsules per plant with eight seeds per capsule. The 1000-seed weight is 6.73 g. The composition of fatty acids observed was, Palmitic (6.26%), Stearic (4.62%), Oleic (22.45%), Linoleic (12.49%) and Linolenic (54.18%). The new variety Sabour Tisi-3 has erect plant type, which produces attractive brown seeds. The flower colour is light blue, and the size and shape are medium and disk shape, respectively. The petal aestivation is twisted (slightly overlap). The filament colour, anther colour, stigma colour, style colour are white, blue, white and blue, respectively. The capsule size and seed length are large. Hence, this elite variety with high yield potential with multiple disease resistance may be a suitable replacement of existing old varieties under Utera conditions to enhance the linseed productivity.

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Finger Millet

Variety VL Mandua 402

The brown seeded finger millet variety VL Mandua 402 was developed at ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora from the cross between GPU 28 (High yielding variety) and VL 347 (Early maturing locally adapted variety) followed by pedigree method of selection in the segregating generations. Based on its superior performance for grain yield and grain quality recorded in state varietal trials, VL Mandua 402 was released for rainfed organic ecology of Uttarakhand by State Seed Sub Committee, Uttarakhand on May 24th, 2024. Subsequently, it was notified by the Central Sub-Committee on Crop Standards, Notification and Release for Agricultural Crops of Varieties vide notification No.S.O.4388 (E) dated 8th October, 2024.The specific area of adaptation of this variety is the rainfed organic condition of Uttarakhand hills.

In Uttarakhand hills, finger millet is a traditional nutri-crop grown from millennia and specifically suited to rainfed and organic agro-ecology of the region. Farmers generally cultivate traditional type blast susceptibleand low yielding landraces with loose panicles which has rendered poor productivity levels of the crop in the region. Therefore, an improved cultivar of finger millet was needed to cater the need of the area. Considering this, a cross was made between GPU 28 and VL347. During the segregating generation ofthe progenies (F2 to F5) derived from the cross GPU 28x VL347, selections were made with an emphasis on resistance to both finger and neck blast diseases, compact panicles and high grain yield. Uniform lines were bulked and tested in station trials.

VL Mandua 402 has recorded high and stable grain yield of 2,261 kg/ha over 3 years (kharif 2019 to kharif 2021) of testing under rainfed organic condition and registered an average yield superiority of 16.51 % over the best check VL Mandua 380(1,941kg/ha). In IVT of all India coordinated trials of small millets conducted during kharif 2022 in inorganic conditions, VL Mandua402 recorded average grain yield of 2,620 kg/ha,which was at par with the early duration check VL Mandua376(2,600 kg/ha). VL Mandua 402 (111 days) has early maturity which is at par with VL Mandua380(109 days) and VL Mandua 324 (111 days). VL Mandua 402 recorded low incidence of leaf blast (2.95), neck blast (18.50%) and finger blast (21.53%) and found moderately resistant in disease screening nurseries of AICRP-small millets.VL Mandua402 is a multi pest resistant variety and recorded very low incidence of Myllocerus weevil (3.73 No./meter row) stem borer (5.55%), shoot aphids (8.15%) and grasshopper (3.82%).

VL Mandua 402 has higher calcium (368 mg/100g) in comparison to the check VL Mandua 324 (294 mg/100g).VL Mandua 402 also has excellent phenotypic acceptability with medium plant height (92.6 cm), semi compact ear heads with high grain density and dark copper colour grains. VL Mandua402 is being conserved at the National Bureau of Plant Genetic Resources (NBPGR), New Delhi with IC No. 650193. VL Mandua402 will add to finger millet diversity for organic farming in the country as a whole and in the state of Uttarakhand in particular. By virtue of its high grain yield, semi-compact ear heads, resistance to neck and finger blast andexcellent grain quality, VL Mandua 402 will provide a new option to farmers growing traditional landraces and old variety of finger milletin the north western Himalayan region.

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Variety VL Mandua 409

The brown seeded finger millet (*Eleusin coracana* L.) variety VL Mandua 409 was developed at ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora from the cross between KMR 118 (high yielding late maturing variety) x VL 347 (early maturing locally adapted variety) following the pedigree method of selection in the segregating generations. Based on its superior performance for grain yield and grain quality recorded in state varietal trials, VL Mandua 409 was released for rainfed organic ecology of Uttarakhand by State Seed Sub Committee, Uttarakhand on May 24th, 2024. Subsequently, it was notified by the Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops with vide notification No.S.O.4388 (E); dated 8th October, 2024.The specific area of adaptation of this variety is the rainfed organic condition of Uttarakhand hills.

In Uttarakhand hills, finger millet is a traditional nutri-crop grown from millennia and specifically suited to rainfed and organic agro-ecology of the region. Farmers generally cultivate traditional type blast susceptibleand low yielding landraces with loose panicles which has rendered poor productivity levels of the crop in the region. Therefore, an improved cultivar of finger millet was needed to cater the need of the area. Considering this, a cross was made between KMR 118and VL347. During the segregating generation ofthe progenies (F2 to F5) derived from the cross KMR 118 x VL347, selections were made with an emphasis on resistance to both finger and neck blast diseases, compact panicles and high grain yield. Uniform lines were bulked and tested in station trials.

VL Mandua 409 has recorded high and stable grain yield of 2,186 kg/haover 3 years (kharif 2020 to kharif 2022) of testing under rainfed organic condition and registered an average yield superiority of 11.87 % over the best check VL Mandua 380 (1,956kg/ha). In farmer's field trials, conducted by State Department of Agriculture, Uttarakhand VL Mandua 409 recorded average grain yield of 2,100 kg /ha.VL Mandua 409 (116 days) has medium maturity which is at par with VL Mandua 380 (116 days) and VL Mandua 324 (117 days). VL Mandua 409 recorded low incidence of leaf blast (3.21), neck blast (13.65%) and finger blast (16.19%) and found moderately resistant in disease screening nurseries of AICRP-small millets. VL Mandua 409 is a multi pest resistant variety and recorded very low incidence of Myllocerus weevil (2.72 No./meter row), stem borer (5.08%), shoot aphids (9.21%) and grasshopper (2.39%) in IVT Coordinated trails conducted during kharif 2022.

VL Mandua 409 has higher calcium (393.0 mg/100g) in comparison to the check VL Mandua 324 (294 mg/100g).VL Mandua 409 also has excellent phenotypic acceptability with medium plant height (91-96 cm), semi compact ear heads with high grain density and dark copper colour grains. VL Mandua 409 is being conserved at the National Bureau of Plant Genetic Resources (NBPGR), New Delhi with IC No. 650192.VL Mandua 409 will add to finger millet diversity for organic farming in the country as a whole and in the state of Uttarakhand in particular. By virtue of its high grain yield, semi-compact ear heads, resistance to neck and finger blast and excellent grain quality, VL Mandua 409 will provide a new option to farmers growing traditional landraces and old variety of finger millet in the north western Himalayan region.

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Forage Maize

Variety J 1008

J 1008 is a new early maturing, yellow seeded composite variety of forage maize (*Zea mays* L.) with high beta carotene content. This variety has been developed by Department of Plant Breeding and Genetics, Punjab Agricultural University, Ludhiana. It was released in Punjab state by the State Variety Approval Committee in August, 2023. The variety J 1008 has been released and notified by Central Sub-Committee on Crop Standards, Notification and Release of Varieties of Agricultural Crops, Department of Agriculture, Cooperation and Family Welfare, Government of India, New Delhi vide notification number S.O. 4388(E) dated October 9, 2024 for cultivation in Punjab State. This variety was developed through intra population improvement in advanced generation of cross between PMH 1 x Vijay. J 1008 was evaluated in research trials in kharif seasons from 2019 to 2021, and recorded an overall green fodder yield 403.8 q/ha, while its checks J 1007 and J 1006 recorded green fodder yield 434.8 q/ha and 420.6 q/ha, respectively. It is earlier by 10 days in milking (73 days) as compared to J 1006 (83 days) and J 1007 (83 days). A per day green fodder productivity of J 1008 was 5.5 q/ha/day, while its checks J 1007 and J 1006 have per day productivity 4.9q/ha/day and 4.8 q/ha per day, respectively. Due to its earliness, it can fit well in existing cropping systems prevalent in Punjab and can also be used for silage making owing to its good nutritional quality. This variety, J 1008 was also evaluated in the trials conducted by AICRP (FCU) from 2020 to 2022 in kharif and exhibited an overall green fodder and dry matter yield 373.5 q/ha and 80.1 q/ha, respectively. In agronomic trials, the variety, J 1008 responded significantly to higher nitrogen doses for green fodder yield, dry matter yield and crude protein yield. The average plant height of this variety is 232.4 cm. The new variety possesses better ear height (91.9 cm), leaf length (87.4 cm), leaf width (7.5 cm) than its check J 1006 having values 102.1cm, 85 cm, 7.2 cm, respectively. While for other ancillary traits viz. number of leaves per plant (9.5), stem girth (1.8 cm) and leaf-stem ratio (0.26), the values possessed by J 1008 were at par with its check J1006. The new variety, J 1008 is moderately resistant to diseases like maydis leaf blight, branded leaf and sheath blight, bacterial stalk rot , charcoal rot and insects like maize stem borer (Chilo partellus), and fall armyworm (Spodoptera frugiperda). This variety performed better for crude protein, crude fibre and dry matter digestibility as compared to J 1007 and J 1006 on the basis of feeding trials conducted by Forage, Millets and Nutrition Section, Department of Breeding and Genetics. The silage prepared from its green fodder was also of good quality. The plants of this maize variety J 1008 are tall, having long, broad leaves and medium ear placement. Owing to its better fodder yield and fodder quality, it is expected that this variety will gain preference among dairy farmers.

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Variety J 1009

J 1009 is a new composite variety of forage maize (*Zea mays* L.) developed by Forage, Millets and Nutrition Section, Department of Plant Breeding & Genetics, Punjab Agricultural University, Ludhiana. The variety J 1009 was identified by Variety Identification Committee in the National Group Meet (Kharif 2023) of All India Coordinated Research Project on Forage Crops and Utilization held on 15-16, June, 2023 at CSKHPKVV, Palampur. The variety J 1009 has been released and notified by the Central Sub Committee on Crop Standards, Notification and Release of Varieties of Agricultural Crops, Department of Agriculture, Cooperation & Family Welfare, Government of India, New Delhi vide Notification number S.O. 4388(E) dated October 9,2024 for cultivation in Central Zone comprising states of Chhattisgarh, Madhya Pradesh, Maharashtra and Uttar Pradesh. This variety was developed through intra population improvement in advanced generation of cross between Local collection `Makk` x Partap makka chari 6`. The variety J 1009 was evaluated in All India Coordinated research project on Forage crops and utilization in kharif season during 2020 to 2022 and recorded an overall superiority over national checks J 1006, African Tall, COHM-8 for green fodder yield by 10.2%, 19.2%and 31.1% respectively in Central Zone. Similarly, this variety J 1009 also out yielded national checks J 1006, African tall, COHM-8 for dry matter yield by 6.2%, 23.0% 28.9%, respectively in Central Zone. This variety J 1009 recorded 8.2%, 25.4, 30.8 higher per day productivity for green fodder yield than the national check varieties J 1006, African tall, COHM-8 in Central Zone respectively. Similarly 9.1%, 20% and 33.3% higher per day productivity was observed for this variety J 1009 for dry matter yield over the national check J 1006, African Tall, COHM-8 in Central Zone, respectively. The variety J 1009 was moderately resistant to Fall army worm and Maydis leaf blight in Central Zone. In agronomy trials, the variety J 1009 showed its superiority for green fodder yield (601.9 q/ha) and dry matter yield (99.1 q/ha) over the best national check African Tall with 519.2q/ha and 87.7 q/ha, respectively. The variety J 1009 also responded significantly to higher nitrogen doses for green fodder yield, dry matter yield as well as crude protein yield. The average height of this variety was 260.6 cm. The new variety J 1009 possesses comparatively better leaf: stem ratio (0.66) with long and broad leaves. This variety was superior in nutritional quality as it exhibited crude protein yield (6.0 q/ha) which was 9.1%,9.1% 20% superior over the national checks J 1006, African Tall, COHM-8, respectively in Central Zone. The performance regarding other quality traits such as crude fibre and in vitro dry matter dry matter digestibility (IVDMD) was at par with that of other check varieties. The salient features of this variety are high green fodder and dry matter yield, more plant height having long and broad leaves, moderately resistant to insect pests and diseases with better fodder nutritional quality. Owing to its better fodder yield and quality, it is expected that this variety will gain preference among the dairy farmers in the states of Chhattisgarh, Madhya Pradesh, Maharashtra and Uttar Pradesh.

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