

High yielding ridge gourd F₁ hybrid from KAU

Ridge gourd F1 hybrids were developed at Kerala Agricultural University, Trichur exploiting cytoplasmic genic male sterility (CGMS) system. Hybrid, KRH-1 is a cross between male sterile female line (KAU-MS-LA 101) and male fertile male line LA-102. It has proved to be highly heterotic with a high yield (7.419 kg/plant) bearing attractive long slender fruits. Hybrid KRH-1 is male fertile and produces more number fruits. Hybrid MS × LA 102 is male fertile and superior in terms of total yield (7.386 kg/plant) when compared to other parents and hybrids.

RIDGE GOURD [*Luffa acutangula* (Roxb.) L.] is an important vegetable in tropical and subtropical countries, and is grown for immature fruit rich in dietary fibre and minerals. It is a highly cross pollinated crop and diverse sex forms viz, monoecious, androecious, gynoeceous, gynomonoeceous, andromonoecious and hermaphrodite exist. Recent hybrids predominate the vegetable cultivation. The advantages of hybrid vegetables are uniform crop stand, increased vigour, earliness, higher yield and resistance to biotic and abiotic stress.

Ridge gourd offers great scope for exploitation of hybrid vigour on commercial scale. The high number of hybrid seeds per cross makes F1 seed production more economical. Male sterility and its utilization for hybrid seed production for large scale is of great scope. Male sterility reported in ridge gourd from India was cytoplasmic in nature, with two dominant male fertility restorer nuclear genes *Rf1* and *Rf2* with complementary gene action governing the restoration of male fertility. Ridge gourd hybrid KRH 1 was developed from Kerala Agricultural University, exploiting cytoplasmic genic male sterility (CGMS) system. Cytoplasmic male sterile system in ridge gourd was converted to cytoplasmic genetic male sterile (CGMS) system through the development of analogues of male sterile (MS) line, maintainer line and fertility restorer line.

Hybrid, KRH-1 is a cross between male sterile female line (KAU-MS-LA 101) and male fertile male line LA 102. It has proved to be highly heterotic with a high yield (7.419 kg/plant) bearing attractive long slender fruits. Hybrid KRH-1 is male fertile and produced more number fruits. Hybrid MS × LA 102 is male fertile and be superior in terms of total yield (7.386 kg/plant) when compared to other parents and hybrids.

Among the different lines Hybrid, MS × LA 102 showed remarkable performance with respect to fruit number (22.06) and fruit length (44.8) (Table 2). The fruit

weight of MS × LA 102 (0.333 kg) is comparable with that of Arka Sumit (0.369 kg) (Table 1).



KRH 1 raised in container

Table 1. Days to harvest, yield and fruit characteristics of ridge gourd hybrids and parents (Mean of 3 years)

| Lines/hybrid | Days to harvest | Yield | Fruit number | Fruit length (cm) | Fruit weight (kg) |
|-----------------|-----------------|-------|--------------|-------------------|-------------------|
| Arka Sumit | 56.6 | 2.346 | 6.63 | 40.4 | 0.369 |
| LA 101 | 56.6 | 2.361 | 10.06 | 44.3 | 0.266 |
| LA 102 | 55.7 | 2.596 | 10.60 | 42.1 | 0.250 |
| MS × Arka Sumit | 56.3 | 4.276 | 13.10 | 43.4 | 0.327 |
| MS × LA 101 | 56.5 | 3.784 | 18.63 | 42.6 | 0.212 |
| MS × LA 102 | 55.3 | 7.386 | 22.06 | 44.8 | 0.333 |
| CV (%) | 0.5 | 17.64 | 15.5 | 6.3 | 15.966 |
| CD (P = 0.05) | 0.5 | 1.31 | 7.0 | 3.3 | 0.112 |

Table 2. Farm trial data of ridge gourd hybrid KRH-1

| Location and address of farmer | No. of fruits/plant | | Yield/plant (kg) | |
|----------------------------------------|---------------------|------------|------------------|-------------|
| | KRH-1 | Arka Sumit | KRH-1 | Arka Sumit |
| Trichur | | | | |
| Pramod, Elanad | 6 | 4 | 3.00 | 1.50 |
| Ramkumar, Elanad | 8 | 3 | 4.00 | 2.00 |
| Malappuram | | | | |
| Jayasree, Naduvattom, Edappal | 32 | 26 | 15.00 | 10.00 |
| Ravi, Edappatta | 25 | 15 | 12.70 | 8.10 |
| Palakkad | | | | |
| Mohanan, Choorakkode | 9 | 6 | 4.16 | 1.75 |
| K Selvamani, Muttimumpalayam, Nattukal | 7 | 5 | 2.70 | 1.27 |
| E. Muraleedharan, Marikulam, Nenmara | 12 | 13 | 6.14 | 4.13 |
| Salam, Chirankara, Kulukkallur | 8 | 6 | 3.32 | 1.82 |
| Suresh, Kollengode | 7 | 7 | 2.50 | 1.72 |
| Mean | 12.6 | 9.4 | 5.94 | 3.58 |



KRH 1 raised in pandal system

Performance of KRH-1 was found superior to commercial check variety Arka Sumit in farm trial extending over 9 locations of Trichur, Palakkad and Malappuram district. On an average, KRH-1 yielded 5.94 kg/plant with 12.6 fruits/plant. Mean yield of Arka Sumit was 3.58 kg/plant with an average of 9.4 fruits/plant (Table 2). Ridge gourd hybrid, KRH-1 is superior to commercial check variety and can be recommended for central zone. This is the first hybrid in ridge gourd developed through CGMS system. MS line is characterized by the production of more number of female flowers and this character is transmitted to the progenies which contributed to the high yield potential of F_1 hybrids involving MS line. F_1 hybrids are popular among farmers and KAU has not released an F_1 hybrid in ridge gourd. Since this F_1



Fruits of KRH 1

hybrid is produced using male sterile technology (CGMS), hybrid seeds can be made available to the farmers at an affordable cost.

Cultural tips for growing ridge gourd

Land preparation and planting

Warm and humid climate is favourable for the growth and development of ridge gourd. The optimum temperature requirement is 25-30°C. It can be grown in all kinds of soil but loam, clay loam and silt soil are best suited for its cultivation. Proper drainage is highly beneficial. Pits of 60 cm diameter and 30-45 cm depth should be taken. Well rotten FYM and fertilizers are mixed with topsoil in the pit and four or five seeds are sown in a pit. Remove unhealthy plants after two weeks and retain three plants per pit. Seed rate recommended is 2.5-3.0 kg/ha with a spacing of 2 m × 2 m. The crop is usually sown during February-March and May-June. It is usually trailed over pandals or trellis.

Manuring

Apply FYM @ 20-25 t/ha as basal dose along with half dose of N (35 kg) and full dose of P₂O₅ (25 kg) and K₂O (25 kg/ha). The remaining dose of N (35 kg) can be applied in two equal split doses at the time of vining and at the time of full blooming. A fertilizer dose of 70:25:25 kg N:P₂O₅:K₂O/ha in several splits is recommended. The fertilizer dose per pit is 28:10:10 g N:P₂O₅:K₂O.

Irrigation

Irrigate at two days interval in the initial stage. When it starts fruiting, irrigate at an interval of 1-2 days a rate ranging from 2-5 litre/hour/plant.

Pests and disease control

Downy mildew and powdery mildew is observed both during summer and winter. Infestation can be managed by using better quality seeds and seed treatment with *Pseudomonas fluorescens* @ 20 g/kg of seed. Diseased leaves and other plant parts should be removed and destroyed. Avoid foliar irrigation in field. There should be enough drainage and air circulation in field. Biocontrol agents like *Pseudomonas fluorescens* @ 20 g/l can be sprayed to the leaves and branches to control foliar diseases. In case of severe infection, apply Nativo (Tebuconazole + trifloxystrobin) @ 0.5 ml/l. Leaf feeding caterpillar, leaf thrips, *Epilachna* beetle and fruit fly are also reported in ridge gourd. Integrated pest management can be adopted for effective control of pests. To control pests biologically or botanically, Neem oil garlic emulsion (20

ml/l) and *Verticillium lecanii* (10 g/l) can be used against leaf feeders and Cow's urine-bird's chilli mixture, Hyptis emulsion against sucking pests. Fruit flies can be controlled by traps like fruit trap and pheromone traps. When the infestation is severe, apply Fame (Flubendamide) @ 1-2 ml/10 l of water against leaf feeders and Actara (Thiomethoxam) @ 2.5 g/10 l of water against sucking pests. Before the application of chemical pesticides, all the fruits reaching harvestable stage should be removed and also wait for at least one week for further harvest after spraying pesticides.

Other cultural operations

To avoid the production of small and deformed fruits, apply micronutrient mixture @ 10g/l at the time of flowering.

Harvesting

Harvest the fruit at immature stage, 7-8 days after flowering. It can be stored for one week at room temperature. Average yield is 10 to 15 t/ha.

Ridge gourd is an important vegetable crop in India and its gaining much prominence in Kerala. The seeds of F₁ hybrid KRH 1 with high yield is ensured to farmers by Kerala Agricultural University in reduced seed price through application of CGMS system. This can lead to extensive cultivation of ridge gourd throughout Kerala making it a profitable crop.

For further interaction, please write to:

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