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Short communications

KAU-MCGy-101:A promising gynoecious line of bittergourd (*Momordica charantia* L.)

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Abstract

A gynoecious line of bittergourd, KAU-MCGy-101, identified from Department of Vegetable Science, Kerala Agricultural University, Vellanikkara is characterised by green pericarp and long ovary. Over a six year evaluation period, the gynoecious line was assessed along with monecious varieties *viz.*, Preethi, Priyanka and MC-136 to study morphological traits, with a focus on sex expression. The gynoecious line produced only female flowers and recorded more number of fruits per plant (49.50) and higher yield (4.92 kg plant^{-1}).The six year trial demonstrated the stability of gynoecious sex expression of KAU-MCGy-101, highlighting its potential for use in genetic improvement programmes of bittergourd.

Key words: Bittergourd, Cucurbit, Gynoecious line, KAU-MCGy-101

Gynoecious breeding lines offer several advantages for hybrid seed production by eliminating the need for emasculation and manual pollination, ensuring 100% hybrid seed purity, and reducing the cost of hybrid seed production. Stable gynoecious lines in bitter gourd was reported in India by Ram et al. (2002a;2002b) and Behera et al. (2006). Subsequent generations using a gynoecious line as the maternal parent showed a very high percentage of pistillate flowers and demonstrated excellent yield potential in both cucumber and bitter gourd (Dey et al., 2010; Shukla et al., 2014; Kumari et al., 2021).

A gynoecious line of bittergourd (*Momordica charantia* L.), KAU-MCGy-101, identified from Department of Vegetable Science, Kerala Agricultural University, Vellanikkara was evaluated for six years from 2019 to 2024 along with monecious varieties *viz*, Preethi , Priyanka and MC-136 for assessing the morphological traits, particularly sex expression. This new gynoecious line is characterised by green pericarp and long ovary which is amenable for propagation through *in vitro* and *in vivo* routes (Minnu et al., 2022). KAU-MCGy-101 was developed through single plant selection from a mutant identified from a segregating

Table 1. Evaluation of bitter gourd lines for sex ratio and days to harvest

	Sex ratio (Male: Female)					Days to harvest				
Year	Preethi	Priyanka	MC136	KAU-MCGy- 101	CD (0.05)	Preethi	Priyanka	MC136	KAU-MCGy- 101	CD (0.05)
2019	18.3	21.5	13.1	0	4.1	61.4	65.3	61.6	52.6	5.2
2020	18.5	26.8	15.3	0	5.7	60.6	64.8	62.9	44.9	6
2021	15.6	22.3	12.4	0	4.3	61.5	63.5	61.8	46.7	5.8
2022	18.4	21.2	13.5	0	4.2	62.3	65.4	60.6	49.8	5.4
2023	17.5	20.5	12.6	0	4.1	62.3	65.2	61.6	51.2	5.5
2024	17.8	20.6	15.2	0	4.2	61.2	63.7	62.5	50.5	5.4
Mean	17.68	22.15	13.68	0	4.34	61.55	64.65	61.83	49.28	5.43

Table 2. Evaluation of bitter gourd lines for fruit length and fruit girth

	Fruit length (cm)					Fruit girth (cm)				
Year	Preethi	Priyanka	MC136	KAU-MCGy- 101	CD (0.05)	Preethi	Priyanka	MC136	KAU-MCGy- 101	CD (0.05)
2019	18	22.01	20.4	16.6	2.5	17.3	18.5	15.4	14.9	1.1
2020	17.2	21.3	24.8	15.7	2.7	17.1	16.5	17.2	15.1	1
2021	18.8	22.6	23.4	15.9	3.1	18.2	16.8	16.3	15	1.2
2022	18.9	22.8	22.8	16.8	2.9	17.5	17.1	16.7	16.1	1.1
2023	17.9	22.9	23.6	16.1	2.7	17.6	16.7	17.1	15.8	1.2
2024	18.2	21.7	23.9	15.9	2.6	17.9	17	16.8	15.2	1.1
Mean	18.16	22.21	23.15	16.16	2.68	17.6	17.1	16.58	15.35	1.09

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Table 3. Evaluation of bitter gourd lines for fruit weight and number of harvests

	Fruit weight (g)					Number of harvests				
Year	Preethi	Priyanka	MC136	KAU-MCGy- 101	CD (0.05)	Preethi	Priyanka	MC136	KAU-MCGy- 101	CD (0.05)
2019	133.6	163.6	153.4	105.4	27.6	6.1	7.5	8.6	9.8	3.4
2020	141.6	194.3	200.3	99.5	20.1	5.7	4.5	5.2	6.9	1.4
2021	138.9	178.6	198.7	103.2	18.9	6.2	6.5	6.7	8.3	1.2
2022	145.8	198.7	191.4	102.6	20.7	5.8	6.8	8.2	8.4	1.4
2023	154.3	196.4	193.2	100.7	21.2	5.6	6.1	7.3	7.9	1.3
2024	157.8	194.6	192.9	99.8	20.3	6.1	6.3	7	8.8	1.7
Mean	145.33	187.7	188.31	101.86	21.23	5.9	6.2	7.1	8.3	1.6

Table 4. Evaluation of bitter gourd lines for number of fruits per plant and yield per plant

	Fruits plant^{-1}					Yield plant^{-1}(kg)				
Year	Preethi	Priyanka	MC136	KAU-MCGy- 101	CD (0.05)	Preethi	Priyanka	MC136	KAU-MCGy- 101	CD (0.05)
2019	40.1	42.5	44.5	57.3	3.4	4.83	5.17	5.24	5.8	0.77
2020	22.3	24.7	28.7	42.2	1.4	2.43	2.72	3.12	4.08	1.37
2021	31.9	33.6	36.6	49.7	2.3	3.63	3.94	4.18	4.94	1.23
2022	32.4	34.2	35.4	48.7	2.4	3.68	3.9	4.02	4.9	0.98
2023	31.8	32.7	36.2	49.2	2.3	3.56	3.84	4.1	4.87	1.1
2024	33.4	34.8	37.4	50.2	2.8	3.72	3.98	4.21	4.96	0.92
Mean	31.9	33.7	36.4	49.5	2.3	3.64	3.92	4.14	4.92	1.02

population of MC-136 (Reshmika, 2020) at Department of Vegetable Science, Vellanikkara. The lines were evaluated under Kharif seasonfrom 2019 to 2024at Department of Vegetable Science, Vellanikkara, adopting Randomised Block Design in five replications. The traits such as sex ratio, days to harvest, fruit length, fruit girth,fruit weight, number of harvests, number of fruits and yield were recorded (Tables 1, 2, 3 and 4). Gynoecious line produced only female flowers and the highest sex ratio was exhibited by the cultivar Priyanka (22.15). Gynoecious line took minimum number of days for harvest (49.20). KAU-MCGy-101 exhibited lower fruit weight (101.86g) compared to monoecious cultivars. Fruits of KAU-MCGy-101 were slightly shorter in length and girth when compared to monoecious cultivars. The extended period of fruiting observed in the gynoecious line resulted in an increase in thenumber of harvests compared to monoecious varieties. The gynoecious line produced more number of fruits/ plant (49.50) and higher yield (4.92 kg plant^{-1}).The six year trialrevealed the stability of gynoecious sex expression of KAU-MCGy-101, which can be further exploited for genetic improvement programme in bitter gourd.

The identified gynoecious line is superior to other gynoecious lines reported in India, particularly in terms of fruit length and weight. The fruit length and weight of DBGy-201, DBGy-202 (Behera et al., 2006), and Gy263B (Ram et al, 2006) were recorded as 8.87 cm and 68.93 g, 8.45 cm and 58.24 g, and 12.8 cm and 60 g, respectively. Hence, the gynoecious inbred, KAU-MCGy-101 holds enormous potential for utilization as a parent for the hybrid development in bitter gourd.

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