

Variety registration report

Registration of new variety CIM – Nirom: A hairless pods, high seed and L-dopa yielding variety of Kewanch (*Mucuna pruriens* L.)

LAL RK* • SINGH S • CHANDRA R • SARKAR S • SINGH SMITA • DHAWAN OP • GUPTAAK • SINGH VR • KUMAR B • GUPTA MM • DHAWAN SS • GUPTA PANKHURI • ZAIM M • YADAV R • SINGH JP • BISHT, BS

Article History

Received: 18th December, 2015

Accepted: 28th December, 2015

Key words

Aphrodisiac

CIM-Nirom

Distinctive features

Diuretic

L-DOPA

Mucuna pruriens

Parkinson

ABSTRACT

Kewanch (Mucuna pruriens L.) belongs to the family “Fabaceae”. The genus Mucuna has about 33 species of climbing vines and shrubs, found worldwide in the wild of tropical areas. M. pruriens plant is an annual, with long vines that can reach over 15 m in height. It is valued for its high levodopa (L-DOPA) content which helps in maintaining cholesterol and blood sugar levels in control. The seed powder of M. pruriens has long been used in traditional, Ayurvedic system of medicine for diseases including Parkinson. Mucuna can also support healthy testosterone levels, which in turn can lead to increased muscle mass and strength. Hence it is also used as an aphrodisiac agent to increase libido in both men and women. A new variety of Mucuna pruriens (CIM – MUC-2, now christened as CIM - Nirom has been developed by CSIR-CIMAP through intensive breeding efforts for improved seed and L-dopa yield/ha. The new variety has consistently recorded a higher seed yield (33 q/ha), better L-DOPA content (4.5%) and L-DOPA yield (150 kg/ha) in comparison to best available check variety CIM-Ajar that gives a seed yield of 24 q/ha with 4.1% L-DOPA content and 91 kg/ha L-DOPA yield. It is ideally suited in orchards for cultivation as climber crop and easy to harvest due to lint (spine) less pods. The unique broad, dark green colour leaf morphology and dark black very bold seeds are the main distinctive features of this variety to satisfy DUS criteria.

© Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP), Lucknow (India)

INTRODUCTION

Mucuna (Family: Fabaceae) is a genus of about 33 species of climbing vines and shrubs, found worldwide in the wild of tropical areas. *Mucuna pruriens* (syn. *Dolichos pruriens*) is a

tropical species which is commonly known as Kewanch. The plant is an annual, climbing shrub with long vines that can reach over 15 m in height. It bears blue, white, lavender, or purple flowers and pods that are covered with loose orange hairs that cause severe itching if come in contact with human skin. The beans are shiny black or brown (Fig. 1). It is mostly found in tropical areas of Africa, India

*Corresponding author, Email: rk.lal@cimap.res.in
CSIR-Central Institute of Medicinal and Aromatic Plants (CSIR) P.O.
CIMAP, Lucknow - 220 015 (India)

Table 1. Performance of Kewanch (*Mucuna pruriens* L.) genetic stocks in initial evaluation trial (2005-06, E=39, Reps = 2 in RBD; single row (3m long row with 50 cm row to row distance and plants grown/climbs/spreads on individual bamboos of 6 fit height)

S. No.	Entries	Codes	Mean seed yield kg/plot	Mean L-dopa content % (air dried seed powder weight basis)
1.	MUC-1	G1	0.125	4.455
2.	MUC-2	G2	0.650	5.500
3.	MUC-3	G3	0.280	5.510
4.	MUC-4	G4	0.175	6.125
5.	MUC-5 (wild)	G5	0.325	6.615
6.	MCW-6	G6	0.325	5.510
7.	MUC-7	G7	0.175	3.300
8.	MUC-8	G8	0.125	2.050
9.	MUC-9	G9	0.300	3.010
10.	MUC-10	G10	0.275	4.130
11.	MUC-11	G11	0.175	3.380
12.	MUC-12	G12	0.325	1.740
13.	MUC-13	G13	0.163	5.010
14.	MUC-14	G14	0.335	3.255
15.	MUC-15	G15	0.445	2.500
16.	MUC-16	G16	0.215	2.760
17.	MUC-17	G17	0.210	2.600
18.	MUC-18	G18	0.400	2.150
19.	MUC-19	G19	0.310	3.455
20.	MUC-20	G20	0.175	4.140
21.	MUC-21	G21	0.275	2.895
22.	MUC-22	G22	0.150	1.905
23.	MUC-23	G23	0.350	4.105
24.	MUC-24	G24	0.275	1.885
25.	MUC-25	G25	0.200	2.490
26.	MUC-26	G26	0.300	4.760
27.	MUC-27	G27	0.255	5.240
28.	MUC-28	G28	0.250	2.140
29.	MUC-29	G29	0.355	3.940
30.	MUC-30	G30	0.200	1.590
31.	MUC-31	G31	0.340	1.455
32.	MUC-32	G32	0.305	4.690
33.	MUC-33	G33	0.240	5.50
34.	MUC-34	G34	0.250	5.650
35.	MUC-35	G35	0.210	3.100
36.	MUC-36	G36	0.178	4.4385
37.	MUC-37	G37	0.250	6.140
38.	MUC-38	G38	0.235	3.935
39.	MUC-39	G39	0.225	4.435
Range			0.125-0.650	1.455-6.615
CV %			16.003	6.121
CD 5%			0.087	0.470
CD 1%			0.116	0.630

and Caribbean islands. *Mucuna* is valued for its high L-DOPA content which helps in maintaining healthy cholesterol and blood sugar levels. The seed powder of *Mucuna pruriens* has long been used in traditional, Ayurvedic system of medicine for diseases including Parkinson. *Mucuna* has also been shown to have diuretic effects. It increases tissue resiliency and improves coordination. *Mucuna* can also support healthy testosterone levels, which in turn can lead to increased muscle mass and strength. In history, *Mucuna* has therefore been used as an aphrodisiac agent. It is still used to increase libido in both men and women. Presently only one variety CIMAJar is available for cultivation (Fig. 2). This variety was also developed by CIMAP about eight year ago for high seed yield (22-24 q/ha) and L-dopa content 6.18%. The seed colour of this variety was dull white with black tinge.



Figure 1. Field view and pods of wild with lints of Kewanch (*Mucuna pruriens* L.)

Table 2. Mean performance of seed yield /plot (kg) in Bench Scale Trial (BST)

S. No.	Entries	Field Evaluation Trials						Hairs on pod
		Bench Scale Trial (RBD, Reps. 3, (bed size 10 x 3m plant to plant and row to row spacing 1x1m around bed on iron polls tide with coconut ropes matchan)					Seed colours	
		Seed yield/plot (kg)				Mean L-dopa content % (air dried seed powder wt basis)		
		1st year	2 nd Year	3 rd Year	Mean			
1.	CIM Nirom	1.683	1.940	1.53	1.718	4.50	Dark Black	Not present
2.	MUC-15	0.850	0.817	0.80	0.822	3.50	White	Not present
3.	MUC-23	0.733	0.700	0.75	0.728	4.10	Black	Not present
4.	MUC-31	0.667	0.717	0.65	0.678	3.94	White	Not present
5.	MUC-29	0.733	0.700	0.67	0.701	4.00	Black	Not present
6.	MUC-5	0.700	0.567	0.72	0.662	4.15	Brown	Present
7.	MCW-6/	0.633	0.700	0.65	0.661	4.20	Dull white	Not present
8.	CIM Ajar (Check)	0.967	1.017	1.05	1.011	4.00	Dull white with black tinged	Not present
	CD (5%)	0.158	0.163	0.196	SD=0.361	SD=0.282		
	CD (1%)	0.219	0.226	0.272				

Table 3. Performance of Kewanch (*Mucuna puriens* L.) genotypes in PST (field evaluation trial)*

S.No.	Entries	Seed yield (ql/ha)	Test weight (gm)	Mean L-dopa content % (air dried seed powder wt basis)	L-dopa yield (kg/ha)	Seed colour	Hairs on pod
1.	CIM Nirom	33.30	174.78	4.50	149.985	Dark Black	Not present
2..	MUC-15	21.50	115.53	2.89	62.135	White	Not present
3.	MUC-23	20.30	150.20	4.02	81.606	Black	Not present
4.	MUC-29	18.40	110.35	4.30	79.120	Black	Not present
5.	CIM Ajar (check)	24.43	112.80	4.10	91.102	Dull white with black tinged	Not present

*-. Genotype selected on the basis of desirable traits like virus tolerance

Table 4. Description of the variety CIM Nirom

Sl. No.	Entries	BST, E=8, RBD, Reps-3, plot size=50.00m ²		
		Fresh herb yield/plot (kg)	Oil Content (%)	Oil yield/plot (g)
1.	EOH-1	122.04	0.84	1022.49
2.	EOH-2	96.19	0.65	638.09
10.	EOH-10	85.95	0.66	631.09
11.	EOH-11	85.75	0.56	492.25
12.	EOH-12	95.75	0.60	574.75
13.	CIM Saumya (Check)	96.98	0.61	586.20
CD 5%	-	6.37	0.071	86.79
CD 1%	-	8.81	0.098	119.97

*-Improvement % over check variety CIM Ajar; **-Estimate based on 100 m² plot size**Table 5. Recommended cultivation schedules for the variety CIM Nirom**

S.No.	Practices	Suitable time
1.	Seed sowing	March to last week of June
2.	Variety MUC-2	Efficiently grow in orchards as climber crop or as a cover crop
3.	Harvesting for pods /seeds	240-250 days after sowing
4.	Easy to harvest	Easy to harvest due to hair less pods

Due to high infection of virus on this variety, the seed yield has reduced along with L-dopa content in this variety. Keeping in mind the importance of



Figure 2 Check variety CIM Ajar



Figure 3. Field view pods (trichome less) and seeds of variety CIM Nirom and check variety CIM – Ajar of Kewanch (*Mucuna puriens* L.)

Mucuna, a need to develop a better strain with high seed and L-dopa yield/ha was felt. Hence, the planned breeding and selection process was undertaken at CSIR-CIMAP, Lucknow to develop such a strain of *Mucuna*. The selection & field trial performance of new strain is provided in Tables 1-6; Fig. 3.

6. Statement of distinction/ breeder's claims:

Variety CIM Nirom is a highly vigorous, dark green leaves, light green stem. Seed colour is black and bold size, 3-palmate leaves; flowers are pea-like but larger, with distinctive curved blue petals, and occurring in racemes. These are the distinguishing morphological features of this variety. The strain has the following DUS (distinctiveness, uniformity and stability) characteristics.

1. The strain is morphologically distinct from other *Mucuna* varieties and clearly identifiable by its broad leaflets with dark green colour (as shown in Figure 2).
2. The pod colour is also dark green.
3. Ripe pod colour is dark black.
4. Pods are hair less.
5. Seed are bold and black in colour with average L-dopa content=4.50 %.

Year of development: 1998-2014

Year of release: 2015 (16-04-2015)

Amount of planting material/seeds available:
15.00 Kg seeds