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SGM. BV. 2 - A New Promising Betel Vine Variety

R. ARULMOZHIYAN[1], R. CHITRA[2], K. PRABAKAR[3], S. MOHAMED JALALUDDIN[4] AND D. PACKIARAJ[5]
1,2: Department of Floriculture and Landscaping, Faculty of Horticulture, TNAU, Coimbatore - 641003
3-5: All India Co-ordinated Research Project on Betelvine, Sugarcane Research Station, Sirugamani - 639115

Abstract : At Sugarcane Research Station, Sirugamani, Betelvine germplasm was collected, maintained and evaluated. From the germplasm pool of 43 entries, four clones were subjected for further testing. They were as follows: SGM 1, Karpuri clone, Vellaikodi clone and Dindugal clone. Among the four entries tested and forwarded at the AICRP-Betelvine Centre, Sirugamani and in 27 multilocations of Tamil Nadu, the Dindugal clone *viz*., SPb 12 excelled all other entries. The yield increase was 9.80, 19.00 and 51.64 per cent respectively, compared to SGM 1, Karpuri clone and Vellaikodi clone. The improved clone registered high protein content of 3.45 per cent, total carbohydrate of 6.63 per cent, vitamin 'C' of 10.28 mg/100g and Eugenol content of 0.08 per cent and the same was released as SGM.BV.2.

Key words : Betelvine, Sesbania, Live support, Masticatory, Dioecious, Orthotropic, Plagiotropic.

Introduction

Betelvine, *Piper betle* L. (Piperaceae) native of Malaysia is grown for its economic spicy leaves, which is used as masticatory. It is a dioecious plant, producing orthotropic (vegetative) and plagiotropic (reproductive) shoots (Mithila *et al*., 2000). Betelvine cultivation is one of the most distinct plant based industries of India, with an approximate turn out of 700 Crores annually (Maiti, 1997) occupying nearly 40,000 ha (Balasubramanyam, 1980) and providing livelihood to 15 lakh farm families and it is a source of foreign exchange. India is the largest producer of betel leaves in the world and the leaves consumption is high in India. With the aim to study the varietal performance, a rich germplasm collection of 43 accessions were made and maintained at AICRP - Betelvine, Sugarcane Research Station, Sirugamani. After preliminary assessment, four entries were intensively screened to identify a high yielding accession.

Materials and Methods

The experiment was conducted from 1993 as evaluation studies involving 43 ecotypes collected from different parts of India through All India Co-ordinated Research Project -on Betelvine. The crop was raised in the open deep trench system using *Sesbania grandiflora* L. as the live support crop. All the beds were given recommended dosage of fertilizers in four split doses and irrigation was given everyday as splash method using a long wooden bowl made out of *Delonix elata* L. The vines were tied regularly using banana fibre/dried split cyprus at 15 day intervals and the leaf harvest was made at 21 day intervals. All the 43 ecotypes collected were evaluated at the experimental farm of AICRP-Betelvine, Sugarcane Research Station, Sirugamani. Among the 43 ecotypes, SPb 12 was found to be promising, which was forwarded to the multilocation trials in different parts of Tamil Nadu in addition to the experimental site. The promising entry was compared with traditional clone *viz*., Vellaikodi and Karpuri and an improved variety *viz*., SGM 1. The results are given below:

Growth and Yield attributes

The growth attributes *viz*., vine elongation and lateral production were measured periodically and it was found out that the SPb-12 excelled the other local checks (Table 1-5).

Table 1. Vine elongation per month (cm)

S.No.	Entry	I Year 1998-99	II year 1999-00	III year 2000-01	IV year 2001-02	Mean	% increase
1.	Spb 12	24.90	23.97	26.42	27.17	25.62	-
2.	SGM 1	17.00	16.02	15.22	17.47	16.43	35.87
3.	Karpuri	18.35	20.40	21.60	21.53	20.47	20.10
4.	Vellaikodi	18.95	18.30	18.57	18.97	18.69	27.04
	SE	0.68	0.69	0.76	1.16		
	CD(P=0.05)	2.09	2.04	2.23	2.46		

Table 2. Laterals production / vine

S.No.	Entry	I Year 1998-99	II year 1999-00	III year 2000-01	IV year 2001-02	Mean	% increase
1.	Spb 12	18.67	19.23	16.80	16.93	17.91	-
2.	SGM 1	17.52	16.75	15.90	16.07	16.56	8.20
3.	Karpuri	12.87	13.25	13.80	13.50	13.36	34.00
4.	Vellaikodi	8.97	10.02	9.50	9.43	9.48	89.92
	SE	0.40	0.52	0.49	0.70		
	CD(P=0.05)	1.20	1.52	1.44	1.48		

Table 3. Leaf yield (lakh/ha/year)

S.No.	Entry	I Year 1998-99	II year 1999-00	III year 2000-01	IV year 2001-02	Mean	% increase
1.	Spb 12	43.82	36.39	36.40	36.77	38.35	-
2.	SGM 1	38.65	32.58	33.50	35.00	34.93	9.80
3.	Karpuri	34.30	29.08	32.60	32.90	32.22	19.00
4.	Vellaikodi	25.97	23.96	25.70	25.53	24.29	51.64
	SE	0.86	1.05	0.90	1.17		
	CD(P=0.05)	2.57	3.08	2.63	2.48		

Results and Discussion

The SPb 12 culture is a high yielder compared to the traditional types and SGM 1 which is an improved variety. The average leaf yield of SPb 12 was 38.35 lakh/ha as compared to 32.22 lakh/ha in Karpuri and 24.29 lakh/ha in Vellaikodi. The yield of SPb 12 was significantly higher over other entries.

Similarly, in the 27 multilocation trials in farmers holdings in eight districts of Tamil Nadu *viz*., Tiruchirappalli, Thanjavur, Karur, Namakkal, Madurai, Dindugal, Erode and Theni, SPb 12 excelled the local checks in yield to the range of 39 to 55 per cent (Table 4 & 5).

Table 4. Performance of Spb.12 in MLT (Tamil Nadu) during 2001-03

S.No.	Locations	Mean leaf yield (lakh/ha/yr)			
		Spb 12	SGM - 1	Karpuri	Vellaikodi
I	Trichirapalli				
	1. Thaneepalli	45.20	32.17	36.82	30.82
	2. Pettavaithalai	40.58	33.51	34.96	32.25
	3. Somarasampettai	42.40	31.74	35.48	35.12
	4. Thottiyam	48.00	36.61	33.52	37.40
	5. Balasamudram	55.25	30.91	40.11	31.22
	6. Seenivasanallur	51.75	38.41	38.15	34.48
II	Thanjavur				
	7. Kattuthotam	63.42	35.36	41.06	28.98
	8. Thiruvaiyaru	62.03	39.60	38.45	32.34
	9. Michaelpatty	68.43	41.84	39.19	36.24
	10. Kumbakonam	60.12	34.25	36.20	35.18
III	Karur				
	11. Paigaiputhur	68.81	52.18	40.58	35.63
	12. Krishnarayapuram	61.29	48.92	41.51	36,61
	13. Lalapettai	63.25	43.52	41.36	35.25
	14. Pugalur	59.51	39.15	37.92	33.33
	15. Velayuthanpalayam	62.36	37.63	38.18	37.05
IV	Namakkal				
	16. Paramathivelur	51.46	49.64	45.63	32.77
	17. Pothanoor	55.93	53.39	48.72	34.89
V	Madurai				
	18. Vadipatti	63.48	52.84	49.36	38.42
	19. Sholavandan	62.94	58.52	47.25	36.82
VI	Dindugul				
	20. Reddalapalayam	74.53	38.47	37.74	35.63
	21. Gandhigramam	69.91	42.19	40.84	34.85
	22. Sirunayakanpatti	72.74	39.49	41.01	30.92
	23. Chinalapatti	72.39	41.93	35.00	29.15
VII	Erode				
	24. Kodumudi	59.22	35.48	36.92	34.58
VIII	Theni				
	25. Periyakulam	55.36	42.19	41.13	38.53
	26. Thamaraikulam	49.06	50.00	43.28	37.62
	27. Vadugapatty	51.10	39.98	34.68	35.94

Table 5. Districtwise yield of Spb.12 (lakh/ha/yr)

S.No.	Districts	No. of MLT	Spb. 12	SGM - 1	Karpuri	Vellaikodi
1.	Thiruchirapalli	6	47.19	33.89	36.51	33.55
2.	Thanjavur	4	63.50	37.76	38.73	33.19
3.	Karur	5	63.04	44.28	39.91	35.57
4.	Namakkal	2	53.69	51.52	47.18	33.83
5.	Madurai	2	63.21	55.68	48.31	37.62
6.	Dindugul	4	72.39	40.52	38.65	32.64
7.	Erode	1	59.22	35.48	36.92	34.58
8.	Theni	3	51.84	44.05	39.69	37.36
	Mean		59.26	42.89	40.74	34.79

Leaf characteristics

The data on the leaf parameters *viz.*, leaf length, breadth, shape, colour, taste, texture, thickness, chewing quality, flavour and acceptability were also assessed and it was found to be significant in SPb-12 (Table 6).

Table 6. Leaf characteristics of Spb.12

S.No.	Character	Spb. 12	SGM - 1	Karpuri	Vellaikodi
1.	Colour	Deep green	Yellowish green	Light green or pale Yellowish green	Green or Yellowish green
2.	Appearance	Karpoori group	Karpoori group	Karpoori group	Karpoori group
3.	Leaf length (cm)	12-17 14.6	16-19 17.1	14-17 15.3	13-18 15.3
4.	Leaf breadth (cm)	9-13 10.7	9-12 10.4	8-10 8.3	8-13 8.6
5.	Leaf Shape	Cordate	Ovate	Oblon	Oblong/Ovate
6.	Texture	Coarse	Coarse	Soft	Medium
7.	Thickness	Thick	Thick	Thin	Medium thick
8.	Chewing quality	Delicate	Moderate	Moderate	Moderate
9.	Keeping quality	8-10 days	8-10 days	7-8 days	5-6 days
10.	Flavour	Good	Good	Very good	Good
11.	Taste	Mild pungent	V pungent	Less pungent	Pungent
12.	Chewin quality	Good	Moderate	Moderate	Moderate
13.	Acceptability	Good	Good	Very good	Good

Reaction to nematode, Insect pest and Diseases

The culture SPb-12 was resistant to linear scale insect and moderately resistant to red spider mite, phytopthora wilt, stem rot, blight and nematodes (Table 7 & 8).

Table 7. Varietal reaction to Nematodes and Insect pests.

S.No.	Entry	Incidence of pests		
		Mean Gall index (RKN) (0-5 scale)	Linear scale insect (mean No./2 mt. vine	Red spider mite (Mean grade Index)
1.	SPb. 12	2.0	1.01	1.50
2.	SGM - 1	2.0	8.91	0.64
3.	Karpuri	5.0	4.00	4.00
4.	Vellaikodi	4.0	3.50	3.00

RKN - Root Knot Nematode

Table 8. Varietal reaction to Diseases

S.No.	Entry	Mean incidence (percentage of diseases)		
		Bacterial leaf stem rot	Anthracnose / Marginal blight	Phytophthora foot rot
1.	SPb. 12	17.5	26.7	20.0
2.	SGM - 1	20.0	26.7	20.0
3.	Karpuri	40.0	73.3	54.0
4.	Vellaikodi	47.5	26.7	46.0

Biochemical analysis

The entries were analysed for biochemical constituents *viz*., protein, total carbohydrates, vitamin 'C', β-carotene and Eugenol content. Estimation of protein was done by Lowry's method and total carbohydrate was estimated by Anthrone method. Vitamin 'C', was estimated by volumetric method. These data are presented in Table 9 and it was found to be significant in Spb. 12.

Table 9. Biochemical analysis of Betel leaves

S.No.	Entry	Protein (%)	Total Carbohydrate (%)	Vit.C (mg/100g)	β-carotene (mg/100g)
1.	SPb. 12	3.45	6.63	10.28	8.32
2.	SGM - 1	3.23	6.50	10.00	7.50
3.	Karpuri	3.12	6.35	9.20	6.09
4.	Vellaikodi	2.94	6.15	8.40	4.87

Biochemical analysis

The results obtained from the betelvine germplasm collected and evaluated, made to release SPb 12 Betelvine as SGM.BV.2- Betelvine during the year 2003 - '04.

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