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#### Sadashiy Nadukeri

Department of Plantation, Spices, Medicinal and Aromatic Crops College of Horticulture, Mudigere, Karnataka, India

#### Umesha K

Emeritus Professor, Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, Bengaluru, Karnataka, India

#### MK Naik

Vice Chancellor, University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka, India

#### Srinivasa V

Professor and Head Department of Vegetable Science, College of Horticulture, Mudigere, Karnataka, India

#### SJ Ankegowda

Principal Scientist and Head, ICAR-Indian Institute of Spice Research, Regional Station, Appangala, Madikeri, Karnataka, India

# Hanumantharaya L

Professor and Head Department of Agricultural Entomology, College of Horticulture, Mudigere, Karnataka, India

#### Shankarappa KS

Assistant professor, Department of Plant Pathology, College of Horticulture, Bengaluru, Karnataka, India

#### Anilkumar GS

Ph.D. Scholar, College of Horticulture, Bengaluru, Karnataka, India

#### Corresponding Author: Sadashiv Nadukeri

Department of Plantation, Spices, Medicinal and Aromatic Crops College of Horticulture, Mudigere, Karnataka, India

# Variability studies in small cardamom (*Elettaria* cardamomum) genotypes for growth characters

Sadashiv Nadukeri, Umesha K, MK Naik, Srinivasa V, SJ Ankegowda, Hanumantharaya L, Shankarappa KS and Anilkumar GS

#### **Abstract**

The name cardamom is most commonly used for the dry capsules of *Elettaria cardamomum* Maton which is herbaceous, perennial monocotyledonous plant belongs to the family Zingiberaceae. It is cross pollinated crop and propagated through both vegetative and seed method, hence, variability is present among the genotypes. The result of the present investigation from the ANOVA showed that, all the growth characters shown significant difference at 1 and 5 per cent level except for the trait leaf breadth. Phenotypic coefficient of variation is slight higher than genotypic coefficient of variation for all the growth characters. Highest GCV (23.5%) and PCV (24.3%) were recorded for the trait number of leaves per tiller. High heritability (99.0%) and genetic advance over mean (48.2%) was noticed for the trait number of vegetative buds per clump.

Keywords: Elettaria cardamomum, GCV, PCV and heritability

#### Introduction

Cardamom (*Elettaria cardamomum* Maton) is herbaceous, perennial monocotyledonous plant belongs to the family Zingiberaceae of the natural order Scitamineae. It is an ancient spice mentioned in ancient Indian Ayurvedic texts, *Charaka Samhita* and *Sushruta samhita*, written in the post-epic period 1400-600 BC (Ravindran, 2002) [11]. The ancient Greeks and Romans also used it in food, medicines and perfumes (Korikanthimath *et al.*, 2001) [5]. The cardamom of commerce is a dried fruit (capsule) known for its sweet delicate aroma, Hence, it is considered as "Queen of spice". Small cardamom is a perennial bushy herb with mauvemarked, orchid-like white flowers and very long, lance-shaped leaves. Indian cardamom is unique in terms of aroma, flavour, size and colour (green) due to warm humid climate, loamy soils rich in organic matter, well distributed rainfall and special cultivation and processing methods (Parthasarathy and Prasath, 2012) [9]. Cardamom is a major flavouring agent in food products, beverages such as tea, cocoa and coffee, baked foods and in confectionaries (Jebur *et al.*, 2014 and Vijayan *et al.*, 2018) [4, 15].

Cardamom is cross-pollinated crop and propagated through seedlings and suckers, occasionally selfing also occurs. Considerable variation is noticed in seedling progenies of cardamom (Padmini *et al.*, 2000) <sup>[8]</sup>. Collection and evaluation of germplasm, quantification of the magnitude of variability existing in different characters and classification into groups helps in identifying productive genotypes. Therefore, it is necessary to partition the observed variability into heritable and non-heritable components by calculating genetic parameters such as genotypic and phenotypic coefficient of variation, heritability and genetic advance.

#### Material and methods

Genetic variability studies in cardamom (*Elettaria cardamomum*) genotypes under the hill zone of Karnataka was carried out during 2016-2017 at Zonal Agricultural and Horticultural Research Station, University of Agricultural and Horticultural Sciences campus Mudigere. The experimental site is situated in the Western Ghats and represents the typical hill zone (Zone-9 and Region-V) of Karnataka and located at 13°25' North latitude and 75°25' East longitude at an altitude of 980 m above mean sea level.

#### **Experimental material**

The details of the experimental materials used and techniques adopted in the present investigation are described below.

Table 1: List of small cardamom (Elettaria cardamomum Maton) working collections used for morphological study

1.         CL-692         ZAHRS Mudigere         Oval/oblong in shape, bold, good yield           2.         M-1         ZAHRS, Mudigere (Local check)         Tolerant to thrips and shoot bore pubescent leaves           3.         M-2         ZAHRS, Mudigere (Local check)         Clonal selection from CL-683           4.         Wayanad         Wayanad, Kerala         Thick stem from the base           5.         CL-671         ZAHRS Mudigere         Prostrate panicle           6.         CL-622         ZAHRS Mudigere         Medium bold capsules with pale green colour           7.         D-751         Mudigere, Karnataka         Medium bold capsules with pale green colour           8.         PV-4         Pampadumpara         Malabar type from Walayar collection           9.         D-168         Mudigere, Karnataka         Semi erect panicle           10.         PDP-4         Pampadumpara         Erect panicle and medium plant height           11.         PDP-14         Pampadumpara         Firect panicle and medium plant height           12.         Pink Pseudostem         Myladumpara         Pink coloured pseudo stem           13.         NCL-1         ZAHRS, Mudigere         Semi erect panicle and medium plant height           15.         Dharmada         Sri Lanka         Erect	S. No.	Genotypes	Origin of genotypes	Unique characteristics		
2. M.1				*		
3. M2   ZAHRS, Modigere (Local check)   Cloud selection from CL-633			•			
Woyamad   Woyamad   Woyamad, Kerluk   Thick sent from the base						
5. CL-671  ZAHRS Mudigere  Medium bold capsules with pale green colour  7. D-751  Mudgere, Karnataka  Medium bold capsules with pale green colour  Muthur type from Waltyar collection  8. PV-4  Pumpudumpara  Mulabur type from Waltyar collection  10. PDP-4  Pampudumpara  Errot punick and medium plant height  11. PDP-14  Pampudumpara  Errot punick and medium plant height  Pick  Mystalianyara  Pick punick and medium plant height  12. Peachstern  Mystalianyara  Pick coloured piseado stem  Pick coloured piseado stem  13. NCL-1  ZAHRS, Mudigere  Seni errot Mysore type, long petide  14. CL-73  ZAHRS, Mudigere  Seni errot Mysore type, long petide  Ceylone-5  Periyar Tiger reserve, Keralu  Ercot punick, gene colour apsule  Ercot punick, gene colour papule  Porty Tiger reserve, Keralu  Ercot punick, gene colour papule  Ercot punick and good plant height  Ercot pu	-					
6. CL-622 ZAHRS Mudigare Mudian bold capaties with pale gene colour 7. D-751 Mudigare, Karnataka Mediann bold capaties with pale gene colour 8. PV-4 Pumpodumpura Malabar type from Walayar collection 9. D-168 Mudigare, Karnataka Semi creet panicle and medium plant height 11. PDP-14 Pumpodumpura 1 breet panicle and medium plant height 11. PDP-14 Pumpodumpura 1 breet panicle and medium plant height 11. PDP-14 Pumpodumpura 1 breet panicle and medium plant height 11. PDP-14 Pumpodumpura 1 breet panicle and medium plant height 11. PDP-14 Pumpodumpura 1 breet panicle and medium plant height 11. PDP-14 Pumpodumpura 1 breet panicle and medium plant height 11. PDP-14 Pumpodumpura 1 breet panicle and plant beight 11. PDP-14 Pumpodumpura 1 breet panicle and plant beight 11. PDP-15 Pumpodumpura 1 breet panicle and plant beight 11. PDP-16 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-17 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle and good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle panicle swith good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle panicle swith good plant height 11. PDP-12 Pumpodumpura 1 Breet panicle panicle swith good plant height 11. PDP-13 Pumpodumpura 1 Breet panicle		-	· · · · · · · · · · · · · · · · · · ·			
D.751	-					
8. PV-4 Pumpadurupara Malabar type from Waloyar collection 9. D.168 Muligere, Karnataka Semi erect practice 10. PDP-4 Pumpadurupara Free poincie and medium plan height 11. PDP-14 Pampadurupara Erect particle and medium plan height 12. Pirk 12. Pirk 13. NCL-1 ZAHRS, Mudigere 14. CL-73 ZAHRS, Mudigere 14. CL-73 ZAHRS, Mudigere 15. Dharmada Siri Lanka Freet particle and good plant height 16. Caylone-5 Puripar Tiger reserve, Kerala Freet particle and good plant height 17. P-10 Pampadurupara 18. Ceyfone-2 Peripar Tiger reserve, Kerala Freet particle, green colour capsule 18. Ceyfone-2 Peripar Tiger reserve, Kerala Freet particle, green colour capsule 19. PDP-12 Pampadurupara 19. PDP-13 Post post post post post post post post p						
9. D-168 10. PDP-4 10. PDP-4 10. PDP-14 11. PDP-14 12. Pink 13. NCL-1 14. CAHRS, Mudigere 13. NCL-1 15. Ditarmada 15. Ditarmada 16. Caylone-5 16. Caylone-5 17. P-10 18. Caylone-5 18. Caylone-5 18. Kallana, Mudigere, Karnataka 19. Periyar Tiger reserve, Kerala 19. PDP-12 20. K-5 18. Kallana, Mudigere, Karnataka 21. D-516 22. MMRD-2 23. D-11 24. Mudigere, Karnataka 25. Kallana, Mudigere, Karnataka 26. Karnataka 27. P-10 28. Mudigere, Karnataka 28. Semi erect, late aftong flowering span 29. D-163 30. Mudigere, Karnataka 39. Semi erect, late aftong with good plant height 20. Mudigere, Karnataka 39. Semi erect, late aftong with good plant height 21. D-160 30. Mudigere, Karnataka 30. Semi erect, late aftong with good plant height 21. D-161 31. Mudigere, Karnataka 32. Semi erect, green colour capsules with good plant height 32. D-11 32. Mudigere, Karnataka 39. Semi erect, green colour gapules with good plant height 30. Forestran, Mudiagere, Karnataka 40. Semi erect, green colour capsules with good plant height 31. Mudigere, Karnataka 40. Semi erect, green colour capsules with good plant height 32. D-163 34. Mudigere, Karnataka 40. Semi erect, green colour capsules with good plant height 36. KMRD-10 37. Forestran, Mudiagere 38. Kallar 38. Kallar 39. Carlone 30. Green Gold 40. Vandammedu, Jodaki 41. MS-1 42. Malana, Mudigere 41. Mudiadurper 42. Mudiadurper 43. Mudiadurper 44. D-164 45. Mudiadurper 45. Mudiadurper 46. Carlone 47. P1 48. Paradurana 48. Mudiadurper 48. Carlone 48. Kallar 48. Mudiadurper 48. Carlone 48. Kallar 48. Mudiadurper 49. Carlone 49. Carlone 40. Mudiadurper 40. Carlone 40. Mudiadurper 40. Carlone 40. Mudiadurper 40. Carlone 40. Mudiadurper 40. Carlone 40. Carlone 40. Carlone 40.						
PDP-14   Pampadampara   Freet panisle and medium plan height			* *	**		
Pope	-					
Prink   Prink coloured pseudo stem   Prink coloured pseudo stem	-					
Pseudonicem  14. CL-73 ZAHRS, Mudigere Semi erect Mysore type, long petiole  14. CL-73 ZAHRS, Mudigere Prostrate pamiele, short span of flowering  15. Dharmada Si Lanka Erect pamiele, gene colour capable  16. Ceylone-5 Periyar Tiger reserve, Kerala Erect pamiel, gene colour capable  17. P-10 Pampadompara Round capables with medium plant height  18. Ceylone-2 Periyar Tiger reserve, Kerala Erect pamiel and good plant height  19. PDP-12 Pampadompara Round capables with medium plant height  19. PDP-12 Pampadompara Semi erect, inte and long flowering span  19. K-5 Kalmane, Mudigere, Karnataka Semi erect, inte and long flowering span  20. K-5 Kalmane, Mudigere, Karnataka Semi erect, inte flowering  21. D-516 Mudigere, Karnataka Semi erect, green colour capables with good plant height  22. KMRD-2 Karnamardi, Koppa Taliki, Karnataka Semi erect, green colour capables with good plant height  23. D-11 Mudigere, Karnataka Semi erect, green colour capables with good plant height  24. D-140 Mudigere, Karnataka Prostrate, Malabar type  25. D-163 Mudigere, Karnataka Prostrate, Malabar type  26. KMRD-10 Karnamardi, Koppa Taliki, Karnataka Semi erect, green colour capables with good plant height  27. P I Pampadompara Early mauring variety with slightly ribbed light green capables. Short paniele  28. Kallar Adimali, Indakii Prostrate, Malabar type  29. CL-679 ZAHRS Mudigere Early mauring variety with slightly ribbed light green capables. Short paniele  30. Green Gold Vandanmend, Idakkii Prostrate type  31. HS-1 Hands Selection, Mudigere  32. MCC-61 Myladumpara Bold capables. Paniele length is good.  33. SKP-5 ICR, Sakleshpur Prostrate type, carly und short span of flowering  34. MCC-12 Myladumpara Bold capables and produce more tillers  35. MCC-21 Myladumpara Bold capables and produce more tillers  36. CSS-800 ISR, Appangala Bold capables. Semi erect capables and drouce more tillers  37. ICR-2 Myladumpara Bold capables semi recte particle length is good.  38. SKP-7 ICR, Sakleshpur Prostrate type, carly und short span of flowering			* *			
14.   CL-73			• •	•		
15.   Dharmada   Sri Lanka   Erect panicle, green colour capsule			•			
16.   Ceylone-5   Periyar Tiger reserve, Kerala   Erect panicle and good plant height	-					
17.						
18.   Ceylon-2   Periyar Tiger reserve, Kerala   Erect panicle and good plant height	-					
PDP-12	17.					
20. K-5 Kalmane, Mudigere, Karnataka Semi erect, late flowering 21. D-516 Mudigere, Karnataka Semi erect, round oblong capsales with good plant height 22. KMRD-2 Kammandi, Koppa Taluk, Karnataka Semi erect, green colour capsales with good plant height 23. D-11 Mudigere, Karnataka Semi erect, green capsules 24. D-140 Mudigere, Karnataka Prostrate, Malabar type 25. D-163 Mudigere, Karnataka Prostrate, Malabar type 26. KMRD-10 Kammandi, Koppa Taluk, Kamataka Semi erect, green colour capsales with good plant height 27. P.1 Pampadumpara Early maturing variety with slightly ribbed light green capsules. Short panicle 28. Kallar Adimali, Idukki Prostrate type 29. CL-679 ZAHRS Mudigere Bold capsules, Panicle length is good. 30. Green Gold Vandammedu, Idukki Dark green coloured bold capsules, Panicle length is good. 31. HS-1 Handi selection, Mudigere 32. MCC-61 Myladumpara Bold capsules and produce more tillers 33. SKP-5 ICRI, Sakleshpur Prostrate type, early and short span of flowering 34. MCC-12 Myladumpara Bold capsules and produce more tillers 35. MCC-21 Myladumpara Bold capsules and produce more tillers 36. CSS-800 IISR, Appangala Bold capsules, Semi erect panicles and dark deep green capsule 37. ICRI-2 Myladumpara Mysore type, clonal selection from MCC-61 38. SKP-1 ICRI, Sakleshpur Prostrate type, early and short span of flowering 39. SKP-72 ICRI, Sakleshpur Prostrate type, early and short span of flowering 40. CL-698 ZAHRS, Mudigere Bold capsules, Semi erect panicles and dark deep green capsule 41. MCC-18 Myladumpara Mysore type, clonal selection from MCC-61 42. CL-608 ZAHRS, Mudigere Bold capsules, Semi erect panicles and dark deep green capsule 43. CS-800 IISR, Appangala Bold capsules, Semi erect panicles may flowering, good plant height 44. Sel-98 ZAHRS, Mudigere Bold capsules with green in colour 45. ICRI, Sakleshpur Prostrate type, early and short span of flowering. 46. CL-608 ZAHRS, Mudigere Medium bold capsules with green in colour 47. 12-7-D11 ZAHRS, Mudigere Superior for number of bearing suckers and high		_				
21. D-516   Mudigere, Karmataka   Semi erect, round oblong capsules	-					
22. KMRD-2 Kammardi, Koppa Taluk, Kamataka Semi erect, green colour capsules with good plant height 23. D-11 Mudigere, Karnataka Semi erect, green capsules 24. D-140 Mudigere, Karnataka Prostrate, Malabar type 25. D-163 Mudigere, Karnataka Prostrate, Malabar type 26. KMRD-10 Kammardi, Koppa Taluk, Kamataka Semi erect, green colour capsules with good plant height 27. P 1 Pampadumpara Early maturing variety with slightly ribbed light green capsules. Short panicle 28. Kallar Adimali, Idukki Prostrate type 29. CL-679 ZAHRS Mudigere Bold capsules, Panicle length is good. 30. Green Gold Vandammedu, Idukki Dark green coloured bold capsules, Panicle length is good. 31. HS-1 Handi selection, Mudigere Drought tolerant and good yield, round capsules 32. MCC-61 Myladumpara Bold capsules and produce more tillers 33. SKP-5 ICRI, Sakleshpur Prostrate type, early and short span of flowering 34. MCC-12 Myladumpara Bold capsules and produce more tillers 35. MCC-21 Myladumpara Bold capsules and produce more tillers 36. CSS-800 IISR, Appangala Bold capsules, semi creet panicles and dark deep green capsule 37. ICRI-2 Myladumpara Bold capsules and produce more tillers 38. SKP-1 ICRI, Sakleshpur Prostrate type, early and short span of flowering 39. SKP-72 ICRI, Sakleshpur Prostrate type, early and short span of flowering 39. SKP-72 ICRI, Sakleshpur Prostrate type, early and short span of flowering 40. CL-688 ZAHRS, Mudigere Bold capsules, nambor of bearing suckers are more 41. MCC-18 Myladumpara High yielding and dark green in colour 42. CL-668 ZAHRS Mudigere Superior for number of bearing suckers are more 43. CCS-800 IISR, Appangala High yielding and dark green in colour 44. Sel-98 ZAHRS, Mudigere Superior for number of bearing suckers are more 45. I0-6-D10 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding 46. 2-5-D11 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding 47. 12-7-D11 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding 48. 2-6-6-D11 ZAHRS, Mudigere Medium		K-5		-		
23. D-11 Mudigere, Karnataka Semi erect, green capsules 24. D-140 Mudigere, Karnataka Prostrate, Malabar type 25. D-163 Mudigere, Karnataka Prostrate, Malabar type 26. KMRD-10 Kammardi, Koppa Taluk, Kamataka Semi erect, green colour capsules with good plant height 27. P-1 Pampadumpara Early maturing variety with slightly ribbed light green capsules. Short panicle 28. Kallar Adimali, Idukki Dark green coloured bold capsules, Panicle length is good. 30. Green Gold Vandanmedu, Idukki Dark green coloured bold capsules, robust in nature, perform well under intensive cultivatif 31. HS-1 Handi selection, Mudigere Drought tolerant and good yield, round capsules 32. MCC-61 Myladumpara Bold capsules and produce more tillers 33. SKP-5 ICRI, Sakleshpur Prostrate type, early and short span of flowering 34. MCC-12 Myladumpara Bold capsules and produce more tillers 35. MCC-21 Myladumpara Bold capsules and produce more tillers 36. CSS-800 IISR, Appangala Bold capsules, somi erect panicles and dark deep green capsule 37. ICRI-2 Myladumpara Mysore type, clonal selection from MCC-61 38. SKP21 ICRI, Sakleshpur Prostrate type, early and short span of flowering 39. SKP-72 ICRI, Sakleshpur Prostrate type, early and short span of flowering 40. CL-698 ZAHRS, Mudigere Bold capsules, Panicle length is good. 41. MCC-18 Myladumpara Bold capsules, Panicle length is good. 42. CL-698 ZAHRS, Mudigere Bold capsules, Panicle length is good. 43. CCS-800 IISR, Appangala High yielding and dark green capsules 44. Sel-98 ZAHRS, Mudigere Superior for number of bearing suckers are more 45. CCS-800 IISR, Appangala High yielding and dark green capsules 46. 2-5-D11 ZAHRS, Mudigere Superior for number of bearing suckers are more 47. 12-7-D11 ZAHRS, Mudigere Superior for number of bearing suckers are more 48. 2-61-6-D11 ZAHRS, Mudigere Superior for number of bearing suckers are more 49. SAHD11 ZAHRS, Mudigere Superior for number of bearing suckers are more 49. SAHD11 ZAHRS, Mudigere Medium bold oval shape capsules 50. SP-7011 ZAHRS, Mudigere Pale or golden	-	D-516		9 1		
24. D-140   Mudigere, Karnataka   Prostrate, Malabar type		KMRD-2	**	Semi erect, green colour capsules with good plant height		
25. D-163 Mudigere, Karnataka Prostrate, Malabar type 26. KMRD-10 Kammardi, Koppa Taluk, Karnataka Semi erect, green colour capsules with good plant height 27. P 1 Pampadumpara Early maturing variety with slightly ribbed light green capsules. Short panicle 28. Kallar Adimali, Idukki Prostrate type 29. CL-679 ZAHRS Mudigere Bold capsules, Panicle length is good. 30. Green Gold Vandanmedu, Idukki Dark green coloured bold capsules, Poulst in nature, perform well under intensive cultivativativativativativativativativativa	23.		Mudigere, Karnataka	Semi erect, green capsules		
26. KMRD-10   Kammardi, Koppa Taluk, Karnataka   Semi crect, green colour capsules with good plant height	24.			Prostrate, Malabar type		
27.         P 1         Pampadumpara         Early maturing variety with slightly ribbed light green capsules. Short panicle           28.         Kallar         Adimali, Idukki         Prostrate type           29.         CL-679         ZAHRS Mudigere         Bold capsules, Panicle length is good.           30.         Green Gold         Vandammedu, Idukki         Dark green coloured bold capsules, Panicle length is good.           31.         HS-1         Handi selection, Mudigere         Drought tolerant and good yield, round capsules           32.         MCC-61         Myladumpara         Bold capsules and produce more tillers           33.         SKP-5         ICRI, Sakleshpur         Prostrate type, early and short span of flowering           34.         MCC-21         Myladumpara         Bold capsules, Semi erect panicles and dark deep green capsule           35.         MCC-21         Myladumpara         Bold capsules, Semi erect panicles and dark deep green capsule           37.         ICRL-2         Myladumpara         Mysore type, clonal selection from MCC-61           38.         SKP21         ICRI, Sakleshpur         Prostrate type, early and short span of flowering           39.         SKP-72         ICRI, Sakleshpur         Prostrate type, early and short span of flowering, good plant height           40.         CL-698	25.	D-163	Mudigere, Karnataka	Prostrate, Malabar type		
28.         Kallar         Adimali, Idukki         Prostrate type           29.         CL-679         ZAHRS Mudigere         Bold capsules, Panicle length is good.           30.         Green Gold         Vandanmedu, Idukki         Dark green coloured bold capsules, robust in nature, perform well under intensive cultivatic           31.         HS-1         Handi selection, Mudigere         Drought tolerant and good yield, round capsules           32.         MCC-61         Myladumpara         Bold capsules and produce more tillers           33.         SKP-5         ICRI, Sakleshpur         Prostrate type, early and short span of flowering           34.         MCC-12         Myladumpara         Bold capsules and produce more tillers           35.         MCC-21         Myladumpara         Terminal flowering           36.         CSS-800         IISR, Appangala         Bold capsules, Semi errect panicles and dark deep green capsule           37.         ICRI-2         Myladumpara         Mysore type, clonal selection from MCC-61           38.         SKP21         ICRI, Sakleshpur         Prostrate type, early and short span of flowering, good plant height           40.         CL-698         ZAHRS, Mudigere         Bold capsules, Panicle length is good.           41.         MCC-18         Myladumpara         Bold capsules, Panicle len	26.	KMRD-10	Kammardi, Koppa Taluk, Karnataka	Semi erect, green colour capsules with good plant height		
29. CL-679 ZAHRS Mudigere Bold capsules, Panicle length is good. 30. Green Gold Vandanmedu, Idukki Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation. 31. HS-1 Handi selection, Mudigere Drought tolerant and good yield, round capsules. 32. MCC-61 Myladumpara Bold capsules and produce more tillers. 33. SKP-5 ICRI, Sakleshpur Prostrate type, early and short span of flowering. 34. MCC-12 Myladumpara Terminal flowering. 35. MCC-21 Myladumpara Bold capsules and produce more tillers. 36. CSS-800 IISR, Appangala Bold capsules, Semi erect panicles and dark deep green capsule. 37. ICR1-2 Myladumpara Mysore type, clonal selection from MCC-61. 38. SKP21 ICRI, Sakleshpur Prostrate type, early and short span of flowering. 39. SKP-72 ICRI, Sakleshpur Prostrate type, early and short span of flowering. 40. CL-698 ZAHRS, Mudigere Bold capsules, Panicle length is good. 41. MCC-18 Myladumpara Bold capsules, Panicle length is good. 41. MCC-18 Myladumpara Bold capsules, number of bearing suckers are more. 42. CL-668 ZAHRS Mudigere Medium bold capsules with green in colour. 43. CCS-800 IISR, Appangala High yielding and dark green capsules. 44. Sel-98 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding. 46. 2-5-D11 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding. 47. 12-7-D11 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding. 48. 26-16-D10 ZAHRS, Mudigere Pale or golden yellow capsules. 50. 29-9-D11 ZAHRS, Mudigere Medium bold val shape capsules. 51. S-1 Pampadumpara Semi erect. 52. MHC-73 Myladumpara Medium plant height, with pale yellow capsules. 53. MHC-26 Myladumpara Erect to semi erect, oval shape capsules. 54. MCC-309 Myladumpara Erect to semi erect, oval shape capsules. 55. APG-284 IISR, Appangala	27.		Pampadumpara	Early maturing variety with slightly ribbed light green capsules. Short panicle		
30. Green Gold   Vandanmedu, Idukki   Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation	28.	Kallar	Adimali, Idukki	Prostrate type		
31.         HS-1         Handi selection, Mudigere         Drought tolerant and good yield, round capsules           32.         MCC-61         Myladumpara         Bold capsules and produce more tillers           33.         SKP-5         ICRI, Sakleshpur         Prostrate type, early and short span of flowering           34.         MCC-12         Myladumpara         Terminal flowering           35.         MCC-21         Myladumpara         Bold capsules and produce more tillers           36.         CSS-800         IISR, Appangala         Bold capsules, Semi erect panicles and dark deep green capsule           37.         ICRI-2         Myladumpara         Mysore type, clonal selection from MCC-61           38.         SKP21         ICRI, Sakleshpur         Prostrate type, early and short span of flowering           39.         SKP-72         ICRI, Sakleshpur         Prostrate type, early and short span of flowering, good plant height           40.         CL-698         ZAHRS, Mudigere         Bold capsules, number of bearing suckers are more           41.         MCC-18         Myladumpara         Bold capsules, number of bearing suckers are more           42.         CL-668         ZAHRS Mudigere         Medium bold capsules with green in colour           43.         CCS-800         IISR, Appangala         High yielding and dark gre						
32. MCC-61   Myladumpara   Bold capsules and produce more tillers	-		,			
33. SKP-5 ICRI, Sakleshpur Prostrate type, early and short span of flowering  34. MCC-12 Myladumpara Terminal flowering  35. MCC-21 Myladumpara Bold capsules and produce more tillers  36. CSS-800 IISR, Appangala Bold capsules, Semi erect panicles and dark deep green capsule  37. ICRI-2 Myladumpara Mysore type, clonal selection from MCC-61  38. SKP21 ICRI, Sakleshpur Prostrate type, early and short span of flowering  39. SKP-72 ICRI, Sakleshpur Prostrate type, early and short span of flowering, good plant height  40. CL-698 ZAHRS, Mudigere Bold capsules, Panicle length is good.  41. MCC-18 Myladumpara Bold capsules, number of bearing suckers are more  42. CL-668 ZAHRS Mudigere Medium bold capsules with green in colour  43. CCS-800 IISR, Appangala High yielding and dark green capsules  44. Sel-98 ZAHRS, Mudigere Bold capsules, Panicle length is good.  45. 10-6-D10 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding  46. 2-5-D11 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding  47. 12-7-D11 ZAHRS, Mudigere Good plant height with more number of bearing suckers  48. 26-16-D11 ZAHRS, Mudigere Pale or golden yellow capsules  49. 8-4-D11 ZAHRS, Mudigere Medium bold oval shape capsules  50. 29-9-D11 ZAHRS, Mudigere Pale or golden yellow capsules  51. S-1 Pampadumpara Medium plant height, with pale yellow capsules  52. MHC-73 Myladumpara Semi erect, oval shape capsules  53. MHC-26 Myladumpara Erect to semi erect, oval shape capsules  54. MCC-309 Myladumpara Erect to semi erect, oval shape capsules	30.	Green Gold	Vandanmedu, Idukki	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation		
34.MCC-12MyladumparaTerminal flowering35.MCC-21MyladumparaBold capsules and produce more tillers36.CSS-800IISR, AppangalaBold capsules, Semi erect panicles and dark deep green capsule37.ICRI-2MyladumparaMysore type, clonal selection from MCC-6138.SKP21ICRI, SakleshpurProstrate type, early and short span of flowering39.SKP-72ICRI, SakleshpurProstrate type, early and short span of flowering, good plant height40.CL-698ZAHRS, MudigereBold capsules, Panicle length is good.41.MCC-18MyladumparaBold capsules, number of bearing suckers are more42.CL-668ZAHRS MudigereMedium bold capsules with green in colour43.CCS-800IISR, AppangalaHigh yielding and dark green capsules44.Sel-98ZAHRS, MudigereSuperior for number of bearing suckers and high yielding45.10-6-D10ZAHRS, MudigereSuperior for number of bearing suckers and high yielding46.2-5-D11ZAHRS, MudigereSuperior for number of bearing suckers high yield and medium bold capsules47.12-7-D11ZAHRS, MudigereGood plant height with more number of bearing suckers48.26-16-D11ZAHRS, MudigereMedium bold oval shape capsules50.29-9-D11ZAHRS, MudigerePale or golden yellow capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium bold capsule and dark green colour leaves53.	30. 31.	Green Gold HS-1	Vandanmedu, Idukki Handi selection, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules		
35. MCC-21 Myladumpara Bold capsules and produce more tillers	30. 31. 32.	Green Gold HS-1 MCC-61	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers		
36.CSS-800IISR, AppangalaBold capsules, Semi erect panicles and dark deep green capsule37.ICRI-2MyladumparaMysore type, clonal selection from MCC-6138.SKP21ICRI, SakleshpurProstrate type, early and short span of flowering39.SKP-72ICRI, SakleshpurProstrate type, early and short span of flowering, good plant height40.CL-698ZAHRS, MudigereBold capsules, Panicle length is good.41.MCC-18MyladumparaBold capsules, number of bearing suckers are more42.CL-668ZAHRS MudigereMedium bold capsules with green in colour43.CCS-800IISR, AppangalaHigh yielding and dark green capsules44.Sel-98ZAHRS, MudigereBold capsules, Panicle length is good.45.10-6-D10ZAHRS, MudigereSuperior for number of bearing suckers and high yielding46.2-5-D11ZAHRS, MudigereSuperior for number of bearing suckers and high yielding47.12-7-D11ZAHRS, MudigereGood plant height with more number of bearing suckers48.26-16-D11ZAHRS, MudigereMedium oval shape capsules49.8-4-D11ZAHRS, MudigereMedium oval shape capsules50.29-9-D11ZAHRS, MudigereMedium bold oval shape capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309 <t< td=""><td>30. 31. 32.</td><td>Green Gold HS-1 MCC-61 SKP-5</td><td>Vandanmedu, Idukki Handi selection, Mudigere Myladumpara</td><td>Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering</td></t<>	30. 31. 32.	Green Gold HS-1 MCC-61 SKP-5	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering		
37.ICRI-2MyladumparaMysore type, clonal selection from MCC-6138.SKP21ICRI, SakleshpurProstrate type, early and short span of flowering39.SKP-72ICRI, SakleshpurProstrate type, early and short span of flowering, good plant height40.CL-698ZAHRS, MudigereBold capsules, Panicle length is good.41.MCC-18MyladumparaBold capsules, number of bearing suckers are more42.CL-668ZAHRS MudigereMedium bold capsules with green in colour43.CCS-800IISR, AppangalaHigh yielding and dark green capsules44.Sel-98ZAHRS, MudigereBold capsules, Panicle length is good.45.10-6-D10ZAHRS, MudigereSuperior for number of bearing suckers and high yielding46.2-5-D11ZAHRS, MudigereSuperior for number of bearing suckers and high yielding47.12-7-D11ZAHRS, MudigereSuperior for number of bearing suckers48.26-16-D11ZAHRS, MudigereGood plant height with more number of bearing suckers49.8-4-D11ZAHRS, MudigereMedium oval shape capsules50.29-9-D11ZAHRS, MudigerePale or golden yellow capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGo	30. 31. 32. 33. 34.	Green Gold HS-1 MCC-61 SKP-5 MCC-12	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering		
38.SKP21ICRI, SakleshpurProstrate type, early and short span of flowering39.SKP-72ICRI, SakleshpurProstrate type, early and short span of flowering, good plant height40.CL-698ZAHRS, MudigereBold capsules, Panicle length is good.41.MCC-18MyladumparaBold capsules, number of bearing suckers are more42.CL-668ZAHRS MudigereMedium bold capsules with green in colour43.CCS-800IISR, AppangalaHigh yielding and dark green capsules44.Sel-98ZAHRS, MudigereBold capsules, Panicle length is good.45.10-6-D10ZAHRS, MudigereSuperior for number of bearing suckers and high yielding46.2-5-D11ZAHRS, MudigereSuperior for number of bearing suckers and high yield and medium bold capsules47.12-7-D11ZAHRS, MudigereGood plant height with more number of bearing suckers48.26-16-D11ZAHRS, MudigereMedium oval shape capsules49.8-4-D11ZAHRS, MudigereMedium oval shape capsules50.29-9-D11ZAHRS, MudigereMedium bold oval shape capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGood yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers		
39. SKP-72 ICRI, Sakleshpur Prostrate type, early and short span of flowering, good plant height 40. CL-698 ZAHRS, Mudigere Bold capsules, Panicle length is good. 41. MCC-18 Myladumpara Bold capsules, number of bearing suckers are more 42. CL-668 ZAHRS Mudigere Medium bold capsules with green in colour 43. CCS-800 IISR, Appangala High yielding and dark green capsules 44. Sel-98 ZAHRS, Mudigere Bold capsules, Panicle length is good. 45. 10-6-D10 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding 46. 2-5-D11 ZAHRS, Mudigere Superior for number of bearing suckers, high yield and medium bold capsules 47. 12-7-D11 ZAHRS, Mudigere Good plant height with more number of bearing suckers 48. 26-16-D11 ZAHRS, Mudigere Medium oval shape capsules 49. 8-4-D11 ZAHRS, Mudigere Pale or golden yellow capsules 50. 29-9-D11 ZAHRS, Mudigere Medium bold oval shape capsules 51. S-1 Pampadumpara Semi erect 52. MHC-73 Myladumpara Medium plant height, with pale yellow capsules 53. MHC-26 Myladumpara Semi erect, Mysore type, oval shape capsules 54. MCC-309 Myladumpara Erect to semi erect, oval shape capsules 55. APG-284 IISR, Appangala Good yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule		
40.CL-698ZAHRS, MudigereBold capsules, Panicle length is good.41.MCC-18MyladumparaBold capsules, number of bearing suckers are more42.CL-668ZAHRS MudigereMedium bold capsules with green in colour43.CCS-800IISR, AppangalaHigh yielding and dark green capsules44.Sel-98ZAHRS, MudigereBold capsules, Panicle length is good.45.10-6-D10ZAHRS, MudigereSuperior for number of bearing suckers and high yielding46.2-5-D11ZAHRS, MudigereSuperior for number of bearing suckers, high yield and medium bold capsules47.12-7-D11ZAHRS, MudigereGood plant height with more number of bearing suckers48.26-16-D11ZAHRS, MudigereMedium oval shape capsules49.8-4-D11ZAHRS, MudigerePale or golden yellow capsules50.29-9-D11ZAHRS, MudigereMedium bold oval shape capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGood yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61		
41.MCC-18MyladumparaBold capsules, number of bearing suckers are more42.CL-668ZAHRS MudigereMedium bold capsules with green in colour43.CCS-800IISR, AppangalaHigh yielding and dark green capsules44.Sel-98ZAHRS, MudigereBold capsules, Panicle length is good.45.10-6-D10ZAHRS, MudigereSuperior for number of bearing suckers and high yielding46.2-5-D11ZAHRS, MudigereSuperior for number of bearing suckers, high yield and medium bold capsules47.12-7-D11ZAHRS, MudigereGood plant height with more number of bearing suckers48.26-16-D11ZAHRS, MudigereMedium oval shape capsules49.8-4-D11ZAHRS, MudigerePale or golden yellow capsules50.29-9-D11ZAHRS, MudigereMedium bold oval shape capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGood yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering		
42.CL-668ZAHRS MudigereMedium bold capsules with green in colour43.CCS-800IISR, AppangalaHigh yielding and dark green capsules44.Sel-98ZAHRS, MudigereBold capsules, Panicle length is good.45.10-6-D10ZAHRS, MudigereSuperior for number of bearing suckers and high yielding46.2-5-D11ZAHRS, MudigereSuperior for number of bearing suckers, high yield and medium bold capsules47.12-7-D11ZAHRS, MudigereGood plant height with more number of bearing suckers48.26-16-D11ZAHRS, MudigereMedium oval shape capsules49.8-4-D11ZAHRS, MudigerePale or golden yellow capsules50.29-9-D11ZAHRS, MudigereMedium bold oval shape capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGood yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21 SKP-72	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height		
43. CCS-800 IISR, Appangala High yielding and dark green capsules  44. Sel-98 ZAHRS, Mudigere Bold capsules, Panicle length is good.  45. 10-6-D10 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding  46. 2-5-D11 ZAHRS, Mudigere Superior for number of bearing suckers, high yield and medium bold capsules  47. 12-7-D11 ZAHRS, Mudigere Good plant height with more number of bearing suckers  48. 26-16-D11 ZAHRS, Mudigere Medium oval shape capsules  49. 8-4-D11 ZAHRS, Mudigere Pale or golden yellow capsules  50. 29-9-D11 ZAHRS, Mudigere Medium bold oval shape capsules  51. S-1 Pampadumpara Semi erect  52. MHC-73 Myladumpara Medium plant height, with pale yellow capsules  53. MHC-26 Myladumpara Semi erect, Mysore type, oval shape capsules  54. MCC-309 Myladumpara Erect to semi erect, oval shape capsules  55. APG-284 IISR, Appangala Good yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21 SKP-72 CL-698	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.		
44.Sel-98ZAHRS, MudigereBold capsules, Panicle length is good.45.10-6-D10ZAHRS, MudigereSuperior for number of bearing suckers and high yielding46.2-5-D11ZAHRS, MudigereSuperior for number of bearing suckers, high yield and medium bold capsules47.12-7-D11ZAHRS, MudigereGood plant height with more number of bearing suckers48.26-16-D11ZAHRS, MudigereMedium oval shape capsules49.8-4-D11ZAHRS, MudigerePale or golden yellow capsules50.29-9-D11ZAHRS, MudigereMedium bold oval shape capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGood yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21 SKP-72 CL-698 MCC-18	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more		
45. 10-6-D10 ZAHRS, Mudigere Superior for number of bearing suckers and high yielding 46. 2-5-D11 ZAHRS, Mudigere Superior for number of bearing suckers, high yield and medium bold capsules 47. 12-7-D11 ZAHRS, Mudigere Good plant height with more number of bearing suckers 48. 26-16-D11 ZAHRS, Mudigere Medium oval shape capsules 49. 8-4-D11 ZAHRS, Mudigere Pale or golden yellow capsules 50. 29-9-D11 ZAHRS, Mudigere Medium bold oval shape capsules 51. S-1 Pampadumpara Semi erect 52. MHC-73 Myladumpara Medium plant height, with pale yellow capsules 53. MHC-26 Myladumpara Semi erect, Mysore type, oval shape capsules 54. MCC-309 Myladumpara Erect to semi erect, oval shape capsules 55. APG-284 IISR, Appangala Good yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21 SKP-72 CL-698 MCC-18 CL-668	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour		
46.2-5-D11ZAHRS, MudigereSuperior for number of bearing suckers, high yield and medium bold capsules47.12-7-D11ZAHRS, MudigereGood plant height with more number of bearing suckers48.26-16-D11ZAHRS, MudigereMedium oval shape capsules49.8-4-D11ZAHRS, MudigerePale or golden yellow capsules50.29-9-D11ZAHRS, MudigereMedium bold oval shape capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGood yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP-72 CL-698 MCC-18 CL-668 CCS-800	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules		
47.12-7-D11ZAHRS, MudigereGood plant height with more number of bearing suckers48.26-16-D11ZAHRS, MudigereMedium oval shape capsules49.8-4-D11ZAHRS, MudigerePale or golden yellow capsules50.29-9-D11ZAHRS, MudigereMedium bold oval shape capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGood yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.		
48.26-16-D11ZAHRS, MudigereMedium oval shape capsules49.8-4-D11ZAHRS, MudigerePale or golden yellow capsules50.29-9-D11ZAHRS, MudigereMedium bold oval shape capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGood yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98 10-6-D10	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS, Mudigere ISR, Appangala ZAHRS, Mudigere ZAHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding		
49. 8-4-D11 ZAHRS, Mudigere Pale or golden yellow capsules 50. 29-9-D11 ZAHRS, Mudigere Medium bold oval shape capsules 51. S-1 Pampadumpara Semi erect 52. MHC-73 Myladumpara Medium plant height, with pale yellow capsules 53. MHC-26 Myladumpara Semi erect, Mysore type, oval shape capsules 54. MCC-309 Myladumpara Erect to semi erect, oval shape capsules 55. APG-284 IISR, Appangala Good yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45.	Green Gold  HS-1  MCC-61  SKP-5  MCC-12  MCC-21  CSS-800  ICRI-2  SKP-72  CL-698  MCC-18  CL-668  CCS-800  Sel-98  10-6-D10  2-5-D11	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS, Mudigere ISR, Appangala ZAHRS, Mudigere ZAHRS, Mudigere ZAHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers, high yield and medium bold capsules		
50.29-9-D11ZAHRS, MudigereMedium bold oval shape capsules51.S-1PampadumparaSemi erect52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGood yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98 10-6-D10 2-5-D11 12-7-D11	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS, Mudigere ZAHRS, Mudigere ZAHRS, Mudigere ZAHRS, Mudigere ZAHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers, high yield and medium bold capsules  Good plant height with more number of bearing suckers		
51.     S-1     Pampadumpara     Semi erect       52.     MHC-73     Myladumpara     Medium plant height, with pale yellow capsules       53.     MHC-26     Myladumpara     Semi erect, Mysore type, oval shape capsules       54.     MCC-309     Myladumpara     Erect to semi erect, oval shape capsules       55.     APG-284     IISR, Appangala     Good yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98 10-6-D10 2-5-D11 12-7-D11 26-16-D11	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS Mudigere IISR, Appangala ZAHRS, Mudigere ZAHRS, Mudigere ZAHRS, Mudigere ZAHRS, Mudigere ZAHRS, Mudigere ZAHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers, high yield and medium bold capsules  Good plant height with more number of bearing suckers  Medium oval shape capsules		
52.MHC-73MyladumparaMedium plant height, with pale yellow capsules53.MHC-26MyladumparaSemi erect, Mysore type, oval shape capsules54.MCC-309MyladumparaErect to semi erect, oval shape capsules55.APG-284IISR, AppangalaGood yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98 10-6-D10 2-5-D11 12-7-D11 26-16-D11 8-4-D11	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS, Mudigere ISR, Appangala ZAHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers, high yield and medium bold capsules  Good plant height with more number of bearing suckers  Medium oval shape capsules  Pale or golden yellow capsules		
53.     MHC-26     Myladumpara     Semi erect, Mysore type, oval shape capsules       54.     MCC-309     Myladumpara     Erect to semi erect, oval shape capsules       55.     APG-284     IISR, Appangala     Good yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98 10-6-D10 2-5-D11 12-7-D11 26-16-D11 8-4-D11 29-9-D11	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS Mudigere ISR, Appangala ZAHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers, high yield and medium bold capsules  Good plant height with more number of bearing suckers  Medium oval shape capsules  Pale or golden yellow capsules  Medium bold oval shape capsules		
54.     MCC-309     Myladumpara     Erect to semi erect, oval shape capsules       55.     APG-284     IISR, Appangala     Good yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98 10-6-D10 2-5-D11 12-7-D11 26-16-D11 8-4-D11 29-9-D11 S-1	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS Mudigere ISR, Appangala ZAHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers, high yield and medium bold capsules  Good plant height with more number of bearing suckers  Medium oval shape capsules  Pale or golden yellow capsules  Medium bold oval shape capsules		
55. APG-284 IISR, Appangala Good yield, bold capsule and dark green colour leaves	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98 10-6-D10 2-5-D11 12-7-D11 26-16-D11 8-4-D11 29-9-D11 S-1 MHC-73	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS Mudigere ISR, Appangala ZAHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers and medium bold capsules  Good plant height with more number of bearing suckers  Medium oval shape capsules  Pale or golden yellow capsules  Medium bold oval shape capsules  Semi erect		
	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98 10-6-D10 2-5-D11 12-7-D11 26-16-D11 8-4-D11 29-9-D11 S-1 MHC-73	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS Mudigere IISR, Appangala ZAHRS, Mudigere Pampadumpara Myladumpara	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers and medium bold capsules  Good plant height with more number of bearing suckers  Medium oval shape capsules  Pale or golden yellow capsules  Medium bold oval shape capsules  Semi erect  Medium plant height, with pale yellow capsules		
56. APG-293 IISR, Appangala Good yield and bold capsule	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98 10-6-D10 2-5-D11 12-7-D11 26-16-D11 8-4-D11 29-9-D11 S-1 MHC-73 MHC-26 MCC-309	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS, Mudigere ISR, Appangala ZAHRS, Mudigere AHRS, Mudigere ZAHRS, Mudigere AHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers, high yield and medium bold capsules  Good plant height with more number of bearing suckers  Medium oval shape capsules  Pale or golden yellow capsules  Medium bold oval shape capsules  Semi erect  Medium plant height, with pale yellow capsules  Semi erect, Mysore type, oval shape capsules  Erect to semi erect, oval shape capsules		
	30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53.	Green Gold HS-1 MCC-61 SKP-5 MCC-12 MCC-21 CSS-800 ICRI-2 SKP21 SKP-72 CL-698 MCC-18 CL-668 CCS-800 Sel-98 10-6-D10 2-5-D11 12-7-D11 26-16-D11 8-4-D11 29-9-D11 S-1 MHC-73 MHC-26 MCC-309 APG-284	Vandanmedu, Idukki Handi selection, Mudigere Myladumpara ICRI, Sakleshpur Myladumpara Myladumpara IISR, Appangala Myladumpara ICRI, Sakleshpur ICRI, Sakleshpur ICRI, Sakleshpur ZAHRS, Mudigere Myladumpara ZAHRS Mudigere IISR, Appangala ZAHRS Mudigere ISR, Appangala ZAHRS, Mudigere AHRS, Mudigere ZAHRS, Mudigere ZAHRS, Mudigere AHRS, Mudigere	Dark green coloured bold capsules, robust in nature, perform well under intensive cultivation  Drought tolerant and good yield, round capsules  Bold capsules and produce more tillers  Prostrate type, early and short span of flowering  Terminal flowering  Bold capsules and produce more tillers  Bold capsules, Semi erect panicles and dark deep green capsule  Mysore type, clonal selection from MCC-61  Prostrate type, early and short span of flowering  Prostrate type, early and short span of flowering, good plant height  Bold capsules, Panicle length is good.  Bold capsules, number of bearing suckers are more  Medium bold capsules with green in colour  High yielding and dark green capsules  Bold capsules, Panicle length is good.  Superior for number of bearing suckers and high yielding  Superior for number of bearing suckers, high yield and medium bold capsules  Good plant height with more number of bearing suckers  Medium oval shape capsules  Pale or golden yellow capsules  Medium bold oval shape capsules  Semi erect  Medium plant height, with pale yellow capsules  Semi erect, Mysore type, oval shape capsules  Erect to semi erect, oval shape capsules		

57.	MHC-10	Myladumpara	Medium plant height with pale yellow capsules				
58.	SKP-170	ICRI, Sakleshpur	prostrate type, with round to oblong capsules				
59.	MHC-18	Myladumpara	A hybrid of the germplasm collections, It has characteristic deep green, angular bold capsules. Performance is fairly good even under rainfed conditions				
60.	MHC-13	Myladumpara	Medium plant height, with green to pale yellow capsules				
61.	SKP-165	ICRI, Sakleshpur	Good plant height with more number of bearing suckers				
62.	PS-44	Pampadumpara	Bold capsules, good panicle length.				
63.	MCC-200	Myladumpara	Early flowering type				
64.	CSS-872	IISR, Appangala	High yielding and dark green capsules				
65.	RR1	IISR, Appangala	Plants of 4th generation of clone 37 collection from ZAHRS Mudigere				
66.	CCS-1	IISR, Appangala	Maximum bearing and bold capsules				
67.	CL-688	ZAHRS Mudigere	Panicle is prostrate type, bold capsules				

#### Statistical analysis of the experimental data

The statistical analysis of the data was carried out using GENSTAT programmes at Department of Crop improvement and Biotechnology, College of Horticulture, Mudigere.

## Results and discussion Analysis of variance

All the variances among entries, checks, varieties and checks *vs.* varieties were found to be significant for all the characters *viz.*, number of tillers per clump, tiller height (cm), number of leaves per tiller, leaf length (cm), number of vegetative buds

per clump. The results of analysis of variance for all the growth characters are presented in Table 2. The variation in all the growth characters is due to difference in the genetic constitution of the genotypes and these results are in accordance with the findings of Kuruvilla *et al.* (2000) <sup>[6]</sup> and Prasath *et al.* (2009) <sup>[10]</sup> and Senthilkumar *et al.* (2017) <sup>[13]</sup> in cardamom. Thus, it can be deduced that, there was recognisably sufficient variability in the material used for the study, which provides ample scope for selecting superior and desired genotypes by the plant breeders for further improvement in cardamom.

Table 2: Analysis of variance for different characters in cardamom (Elettaria cardamomum) genotypes

	Mean sum of squares 2016-17						
Characters	Block	Entries	Checks	Varieties	Checks vs. Varieties	Error	
Characters	Degrees of freedom						
	7	66	2	63	1	14	
Number of tillers/clump	10.23	41.85**	42.20	37.67**	304.27*	12.13	
Tiller height (cm)	42.58	2171.98**	20947.71**	1037.67**	36081.61**	90.99	
Number of leaves/tiller	1.40	20.39**	30.27**	16.36**	254.07**	0.89	
Leaf length (cm)	6.15	77.96**	265.65**	63.81**	594.14**	19.77	
Leaf breadth (cm)	0.53	3.72	4.09	3.59	11.14	0.26	
Number of vegetative buds/clump	0.24*	3.33**	8.41**	3.18	2.68**	0.04	

<sup>\*</sup>Significant @5% and \*\*Significant @ 1% level

## Genetic variability, heritability and genetic advance

Genetic variability, heritability and genetic advance for the growth character in cardamom are presented in table 3. Number of tillers per clump recorded a phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV) of 21.9 and 17.3 per cent, respectively. Magnitude of heritability estimated was high (62.4%) accompanied with low estimates of GA (7.3) and high expected genetic advance of 28.2 as per cent mean was observed among the genotypes during 2016-17. The tiller height showed moderate PCV (12.3%) and GCV (11.6%). The trait had a high heritability of 89.1 per cent accompanied with high estimates of GA (53.1) and GAM (22.7%). The phenotypic and genotypic coefficients of variability for number of leaves per tiller were 24.3 and 23.5 per cent, respectively. It had a high heritability of 93.2 per cent coupled with low genetic advance (6.9) and high genetic advance over mean of 46.7 per cent for number of leaves per tillers for the trait number of leaves per tillers. Leaf length recorded moderate PCV (13.4%) and GCV (10.7%). The magnitude of heritability estimates was high (63.7%) accompanied with low estimate of GA (9.7) and moderate GAM of 17.6 per cent of mean was observed among the genotypes. Similarly, the genotypic and phenotypic coefficients of variations were 14.6 and 15.3 per cent respectively for leaf breadth, high heritability of 90.9 per cent accompanied with low estimates of genetic advance (3.2) and high genetic advance of 28.7 per cent over mean. Number of vegetative buds per clump manifested high PCV (23.7%) and GCV (23.6%). The magnitude of heritability estimated was high (99.0%) with low GA (3.2) and high GAM of 48.2 as per cent mean.

High phenotypic and genotypic coefficients of variability, heritability and genetic advance over the mean were observed for number of leaves per tiller indicating existence of broad genetic base for the trait which could be exploited by further selection and it indicates the additive gene action as it has shown high heritability and high genetic advance over mean. Gupta et al. (2016) [2] in large cardamom, Verma et al. (2014) [14] and Salimath et al. (2017) [12] in turmeric recorded low to moderate variability accompanied with high heritability and genetic advance over percent mean for the trait. Leaf length recorded moderate PCV and low GCV for the trait accompanied with high heritability and moderate GAM, while leaf breadth revealed moderate genotypic and phenotypic coefficients of variations with high heritability and genetic advance over mean. Similar results were recorded by Nirmalbabu et al. (1993) [7] in turmeric, while Gupta et al. (2016) [2] in large cardamom recorded moderate variability with high heritability and high GAM. Number of vegetative buds per clump exhibited moderate GCV, PCV as well as GAM with high heritability. Hrideek et al. (2015) [3] in cardamom recorded non-significant association for the trait.

High PCV and GCV accompanied with high heritability and high GAM were observed for the traits which suggest existence of additive gene action and is amenable for direct selection. The results of the present investigation are in accordance with Hrideek *et al.* (2015) [3] in cardamom, Fukrei *et al.* (2011) [1] in rice.

**Table 3:** Coefficient of variation, heritability, genetic advance and genetic advance as per cent mean for growth characters in cardamom (*Elettaria cardamomum*) genotypes

Characters	PCV (%)	GCV (%)	h <sup>2</sup>	GA	GAM (%)
Number of tillers/clump	21.9	17.3	62.4	7.3	28.2
Tiller height (cm)	12.3	11.6	89.1	53.1	22.7
Number of leaves/tiller	24.3	23.5	93.2	6.9	46.7
Leaf length (cm)	13.4	10.7	63.7	9.7	17.6
Leaf breadth (cm)	15.3	14.6	90.9	3.2	28.7
Number of vegetative buds/clump	23.7	23.6	99.0	3.2	48.2

GCV & PCV: 0-10%-low; 10.1-20%-Moderate; >20.1%-High. Heritability: 0-30%-Low; 30-60%-Moderate; 60% & above-High. GA and GAM: 0-10%-low; 10.1-20%-Moderate; >20.1%-High.

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