

# Pedigree

## of Multivoltine [V<sub>3</sub>] Silkworm Breeds (*Bombyx mori* L.) developed at CSRTI, Mysore

Dr.B.B.Bindroo

Mrs.V.Premalatha

Dr.Dayananda

Dr.S.M.Moorthy

Mr.C.Parameshwara

Mr.K.P.Shivakumar



**SILKWORM BREEDING LABORATORY**

**Central Sericultural Research & Training Institute,**

[An ISO 9001: 2008 Certified]

**Central Silk Board** (Ministry of Textiles: Govt. of India)

Manandavadi Road, Srirampura, Mysore – 570 008

June, 2014

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**Dr. B.B. BINDROO  
Mrs. V.PREMALATHA  
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Authors:

Dr. B.B. BINDROO  
Mrs. V.PREMALATHA  
Dr. DAYANANDA  
Dr. S. M. MOORTHY  
Mr.C.PARAMESHWARA  
Mr.K.P.SHIVAKUMAR

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Mr.V.Ganesan, DD (Computer)

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## **Preface**

Though India is a second largest producer of silk only next to China, still there is a vast gap between the production and demand for silk. The productivity and quality of Indian silk needs great improvement and silkworm breeds have to contribute significantly in the quality improvement and silk productivity for which the role of silkworm germplasm is vital to provide the basic breeding resource material to the silkworm breeders. The selection of initial parents to be used as breeding resource material is of prime importance and determines the degree of success of any breeding programme to a large extent. Therefore, proper and appropriate identification of suitable parents, their judicious utilization and choice of mating to generate ample genetic variability for facilitating enough scope for selection are crucial for the breeders.

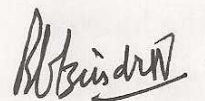
In order to make Indian silk industry globally competitive in the current scenario, thrust is given to enhance the production as well as quality of silk in the country. Towards this goal the emphasis on the production of quality silk from bivoltine hybrids needs to be continued and intensified further. However, the pace at which bivoltine is picking up in the country is inadequate and the increasing demand for bivoltine silk is being met with imported raw silk. Since around 90% of the Indian silk is cross breed oriented, there is an urgent need to improve the quality of silk of multivoltine x bivoltine hybrids.

Recent efforts in silkworm breeding have led to the development of many productive polyvoltine breeds, which have the potential to produce gradable silk. Even though they are known for their productive merit, absence of genetic plasticity to buffer against the tropical environmental stress act as a constraint to exploit the full potential of the breeds in the field. However, polyvoltine races/breeds of indigenous origin in tropical countries are known to have relatively higher tolerance for biotic/abiotic stresses, which is not true

with evolved polyvoltine breeds that have been developed specially for their productivity. With the expansion of sericulture there is a pressure on Indian silkworm breeders to evolve breeds for region/seasons specific, tolerant to biotic/abiotic stress and superior fibre quality. Therefore silkworm breeders have a tremendous task of developing breeds of silkworm with different characters required by the industry. This necessitates a continuous programme of silkworm breeding for which diverse silkworm genetic resources are required.

Central Sericultural Research and Training Institute (CSRTI), Mysore has developed many polyvoltine breeds endowed with improved qualitative and quantitative traits. This document comprises of information on salient features and economic traits of fifteen evolved polyvoltine silkworm breeds of CSRTI, Mysore, which will be useful to the silkworm breeders for planning and designing of appropriate breeding strategies. The lines, which are identified through selection for their productivity, quality and robustness, could be effectively utilized as breeding resource material by the research institutions. I am very much sure that, the information available in this document finds its way as a handy tool which will help the silkworm breeders of other research institutions in selecting the breeding resource material in their breeding programme for the development of polyvoltine breeds of specific features and subsequent identification of suitable cross breed combinations.

25<sup>th</sup> June 2014



[Dr. B.B. BINDROO]

DIRECTOR

# *INDEX*

<b>S.No.</b>	<b>Name of the strain/Breed</b>	<b>Page</b>
1	Pure Mysore	1
2	BL24	2
3	BL67	4
4	BL68	6
5	BL69	8
6	96A	10
7	96E	12
8	2000H	14
9	ND7	16
10	NDV6	18
11	ND5	20
12	NP1	22
13	AGL3	24
14	AGL5	26
15	L14	28
16	L15	30
17	Abbreviations	32
18	Breeders and experts contributed towards development of silkworm breeds	33

# 1. Pure Mysore

## Parentage:

- Indigenous race

## Characteristics:

- Indigenous race quite popular with the farmers of South India
- Eggs are light yellow in color with white Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour and having longer larval duration
- Cocoons are greenish yellow in colour, spindle in shape, having no grains and contain high floss
- Adults exhibit bimodal emergence and creamy white in color
- Low productive race with inferior pre and post cocoon parameters
- A very good combiner with bivoltine breeds. Being used as female parent for popular cross breed PM x CSR2

## Rearing and reeling traits:

Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
450 ±25	27:00 ±1:00	8:00 ±1:00	90.00 ±5.00	0.00	1.020 ±0.17	0.145 ±0.04	14.19 ±0.78	14.78 ± 0.5	0.877 ± 0.1	65.00 ±5.00

FL (m)	FS (d)	RS (%)	RSR (%)	Neat- ness (%)	BOL (%)	Coc. /kg	Egg recovery		Hib. %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
400 ±25	2.10 ±0.2	9.00 ±1.0	60.00 ±5.0	85.00 ±1.0	28.00 ±1.00	985 ±25	40 ± 2	60 ±5	0.0	2000 ±100	11:00 ±1:00

## Larvae and Cocoons:



## 2. BL24

### Parentage:

- [Hosa Mysore x Nistari] x [NB7]

### Characteristics:

- Developed during 1995
- Developed for better productivity over PM
- Eggs are light yellow in color with light yellow Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are greenish yellow in colour, elongated oval in shape with coarse grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color
- Female parent for BL24 x NB4D2 and BL24 x C.Nichi (Varuna), authorized crossbreeds for irrigated and rainfed mulberry respectively.

### Rearing and reeling traits:

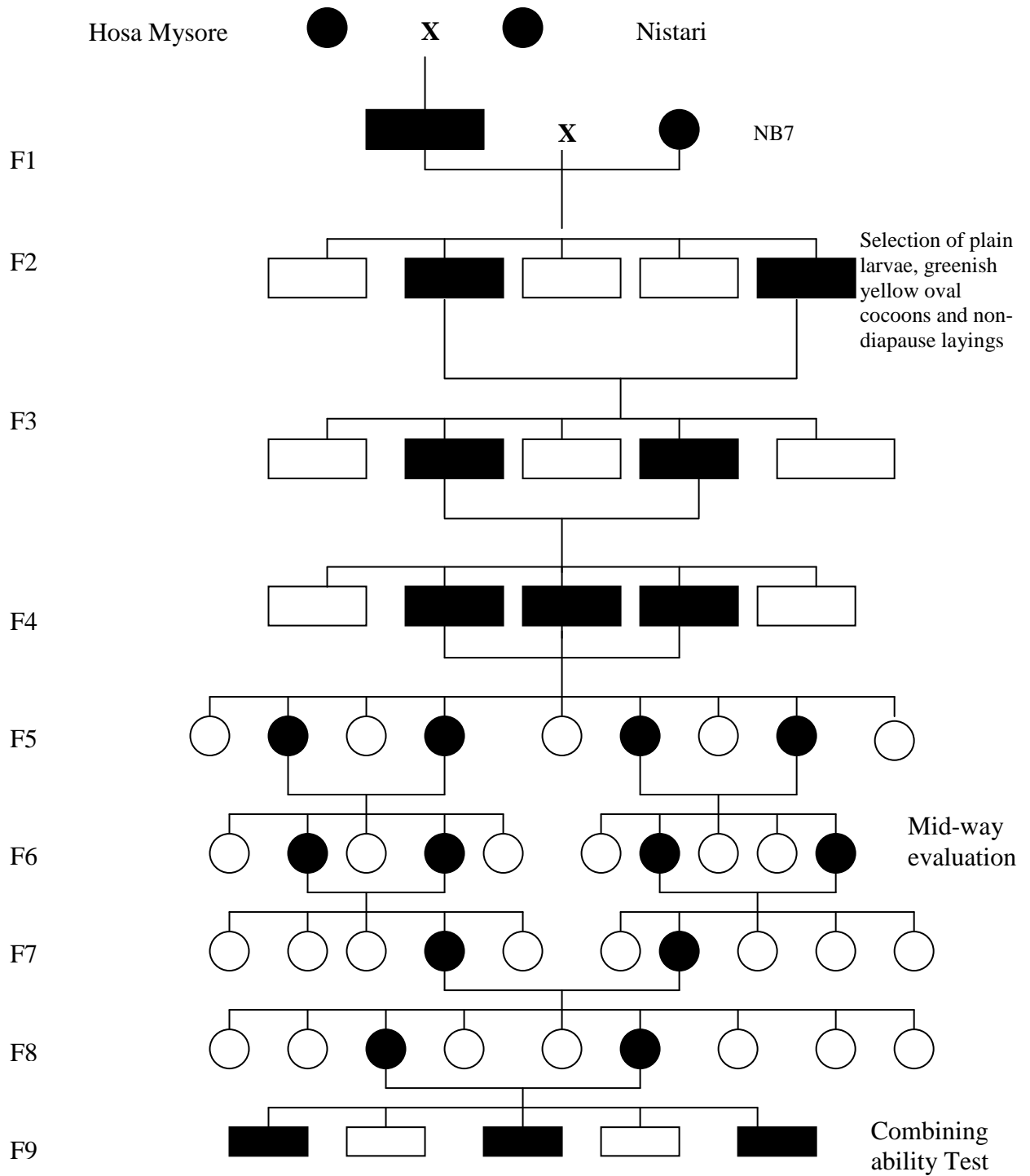
Fec (no)	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
501 ±20	22:18 ±1:00	5:16 ±0:13	89.13 ±4.83	00	1.070 ±0.16	0.188 ±0.03	17.49 ±0.87	6.50 ±1.00	0.883 ±0.13	69.27 ±2.50

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
430 ±50	2.47 ±0.09	10.04 ±0.87	68.41 ±7.79	86.00 ±2.00	27.50 ±1.00	900 ±25	35.00 ± 2	60 ±5	00	1815 ±100	13:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



Mass non-selected



Mass selected



Cellular selected



Cellular non-selected

### 3. BL67

#### Parentage:

- BL24 x BL27

#### Characteristics:

- Developed during 1998
- Developed for its high cocoon shell weight and tolerant to high temperature
- Eggs are yellow in color with light yellow Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, oval in shape with medium to coarse grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color
- Female parent for BL67 x CSR101 (Cauvery), authorized crossbreed for irrigated mulberry.

#### Rearing and reeling traits:

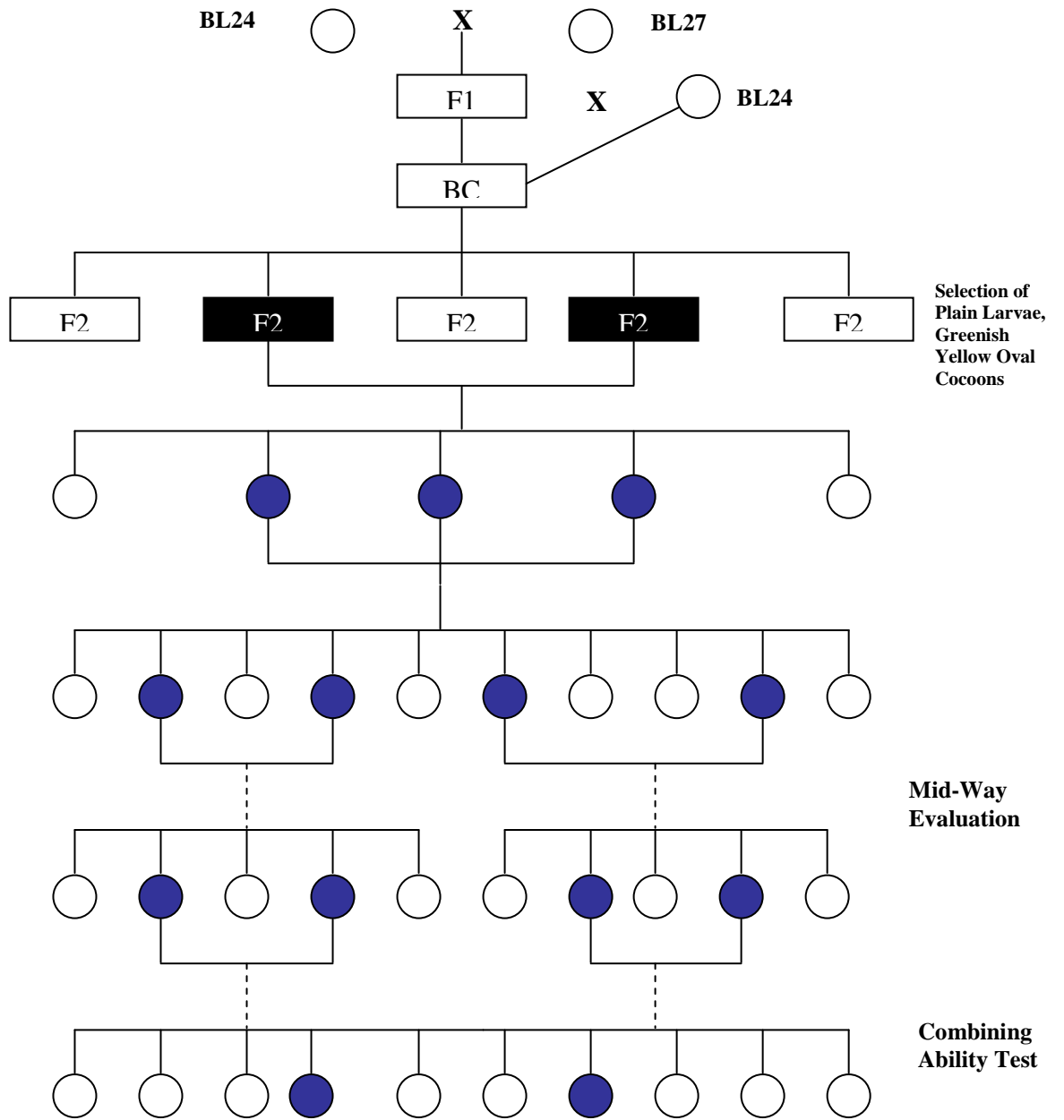
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
519 ±48	22.04 ±1:06	5:09 ±0:10	90.90 ±4.35	2.00 ±1.00	1.240 ±0.15	0.223 ±0.03	17.98 ±0.89	7.50 ±1.00	1.017 ±0.12	73.00 ±11

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
641 ±48	2.24 ±0.39	11.46 ±1.62	65.24 ±8.16	86.00 ±1.00	25.74 ±1.50	800 ±10	37.00 ± 2	63 ±5	1.06 ±0.67	1855 ±100	12:00 ±1:00

#### Larvae and Cocoons:



**Breeding Plan:**



Cellular Selected     
  Cellular Non - Selected     
  Mass Selected     
  Mass Non - Selected

## 4. BL68

### Parentage:

- BL33 x BL27

### Characteristics:

- Developed during 1998
- Developed for its high cocoon shell weight and tolerant to high temperature
- Eggs are yellow in color with light yellow Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, elongated oval in shape with medium to coarse grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color

### Rearing and reeling traits:

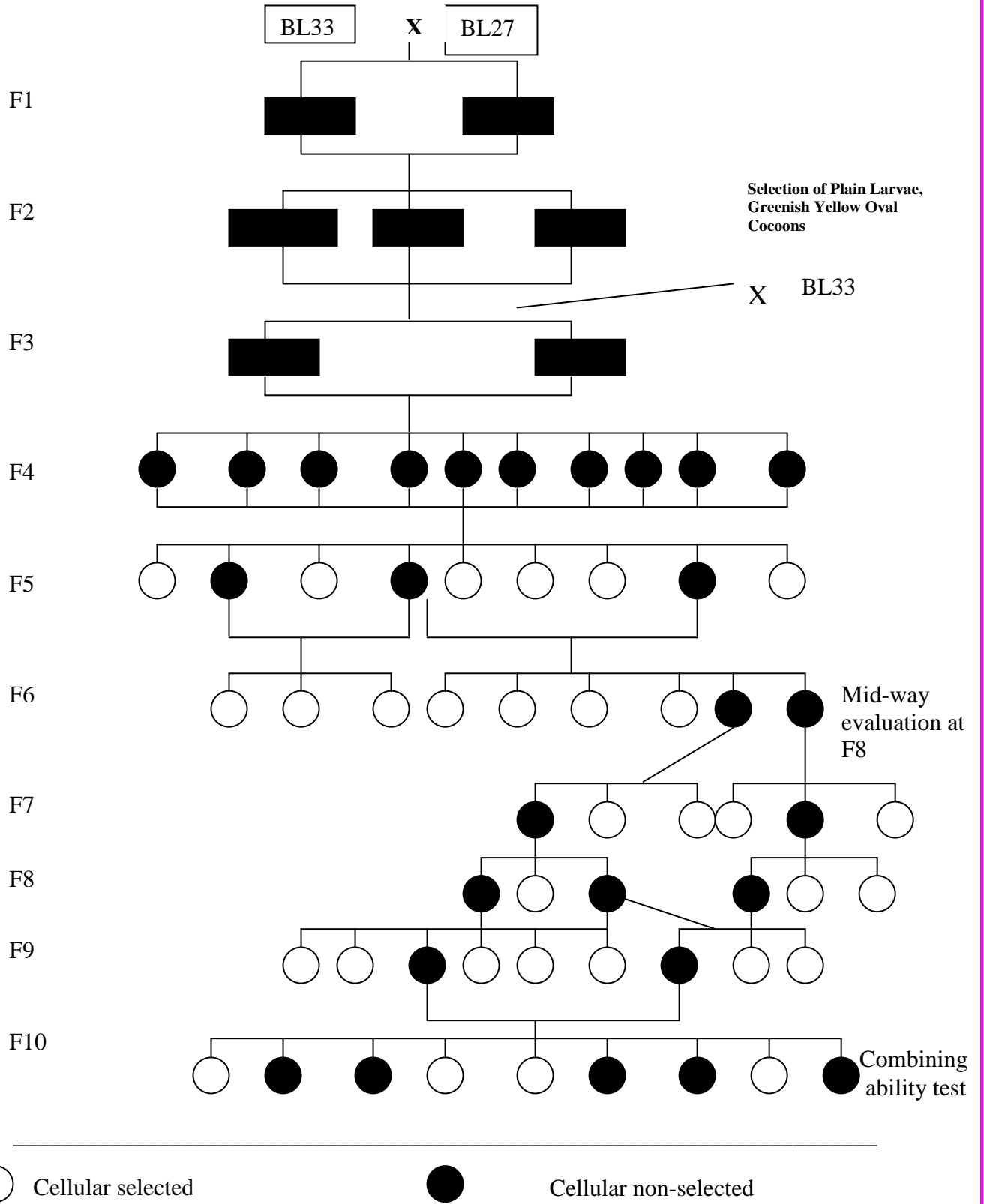
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
545 ±34	22:18 ±1:00	5:16 ±0:13	91.52 ±3.73	1.00 ±0.03	1.228 ±0.13	0.229 ±0.03	18.68 ±0.80	8.10 ±1.00	0.999 ±0.11	73.94 ±6.62

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
626 ±63	2.19 ±0.16	11.41 ±1.14	63.48 ±5.86	87.00 ±1.00	26.33 ±1.53	800 ±20	35.00 ± 2	66 ±5	00	1860 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



## 5.BL69

### Parentage:

- PM x CSR2

### Characteristics:

- Developed during 1998
- Developed for its productivity with better pre and post cocoon parameters over PM
- Eggs are yellow in color with white Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Total larval duration 22-23 days with 5-6 days of 5th age duration
- Cocoons are light greenish yellow in colour, elongated oval in shape with medium to coarse grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color

### Rearing and reeling traits:

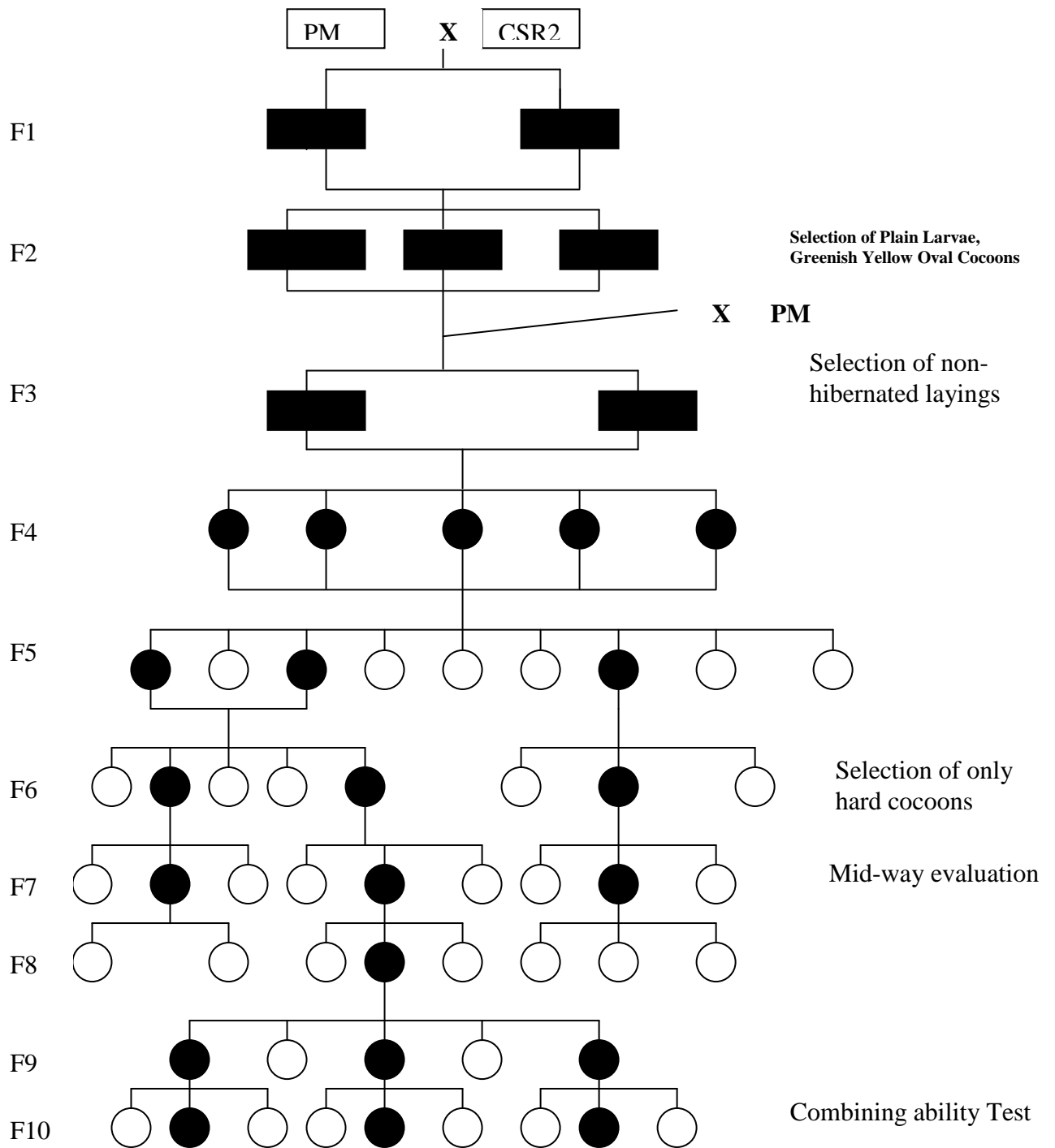
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
504 ±44	22:18 ±1:00	5:16 ±0:13	89.95 ±7.19	0.33 ±0.01	1.193 ±0.10	0.207 ±0.02	17.35 ±0.85	8.00 ±1.00	0.986 ±0.08	77.85 ±7.82

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
529 ±63	2.14 ±0.29	10.75 ±1.40	62.77 ±8.56	86.00 ±1.00	26.00 ±1.50	800 ±25	36.00 ± 2	65 ±5	00	1865 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



Cellular selected



Cellular non-selected

## 6. 96A

### Parentage:

- BL61 x CSR2

### Characteristics:

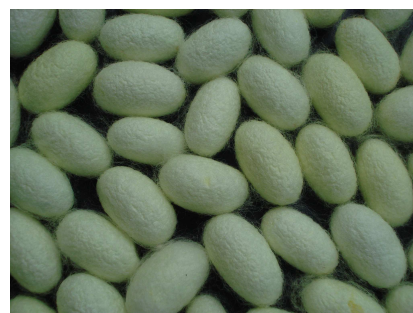
- Developed during 1998
- Developed for its high cocoon shell weight and fiber characters
- Eggs are yellow in color with white Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, short oval in shape with medium grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color

### Rearing and reeling traits:

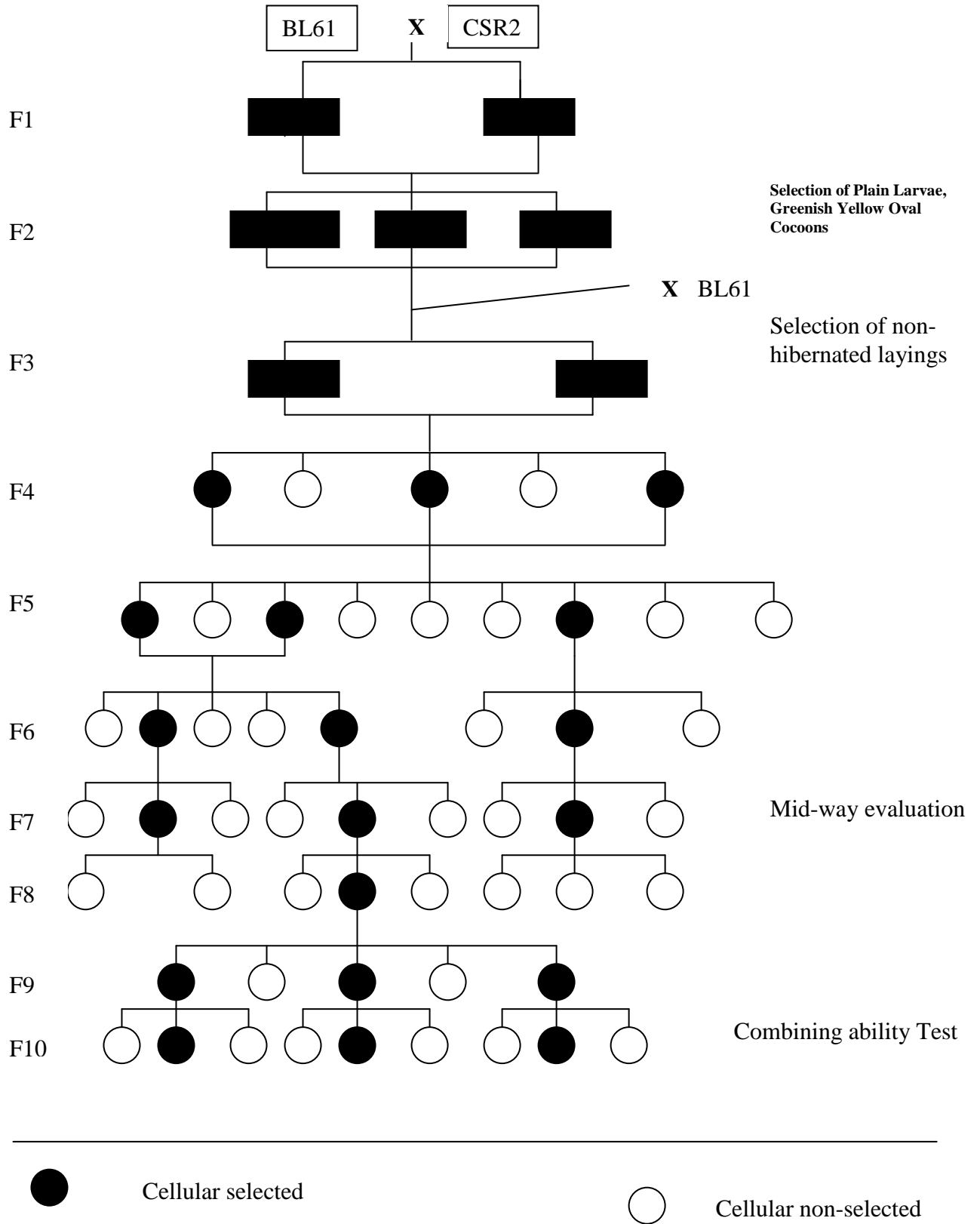
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
482 ±24	22:14 ±1:02	5:12 ±0:15	88.20 ±6.65	1.15 ±0.51	1.220 ±0.17	0.221 ±0.04	18.08 ±0.78	7.00 ±1.00	0.999 ±0.04	77.84 ±6.79

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
577 ±66	2.26 ±0.34	10.63 ±1.00	57.92 ±4.68	87.00 ±1.00	25.00 ±1.50	800 ±20	38.00 ± 3	65 ±5	2.95 ±0.10	1850 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



## 7. 96E

### Parentage :

- BL65 x CSR2

### Characteristics:

- Developed during 1998
- Developed for its high cocoon shell weight and fiber characters
- Eggs are yellow in color with white Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, oval in shape with medium grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color

### Rearing and reeling traits:

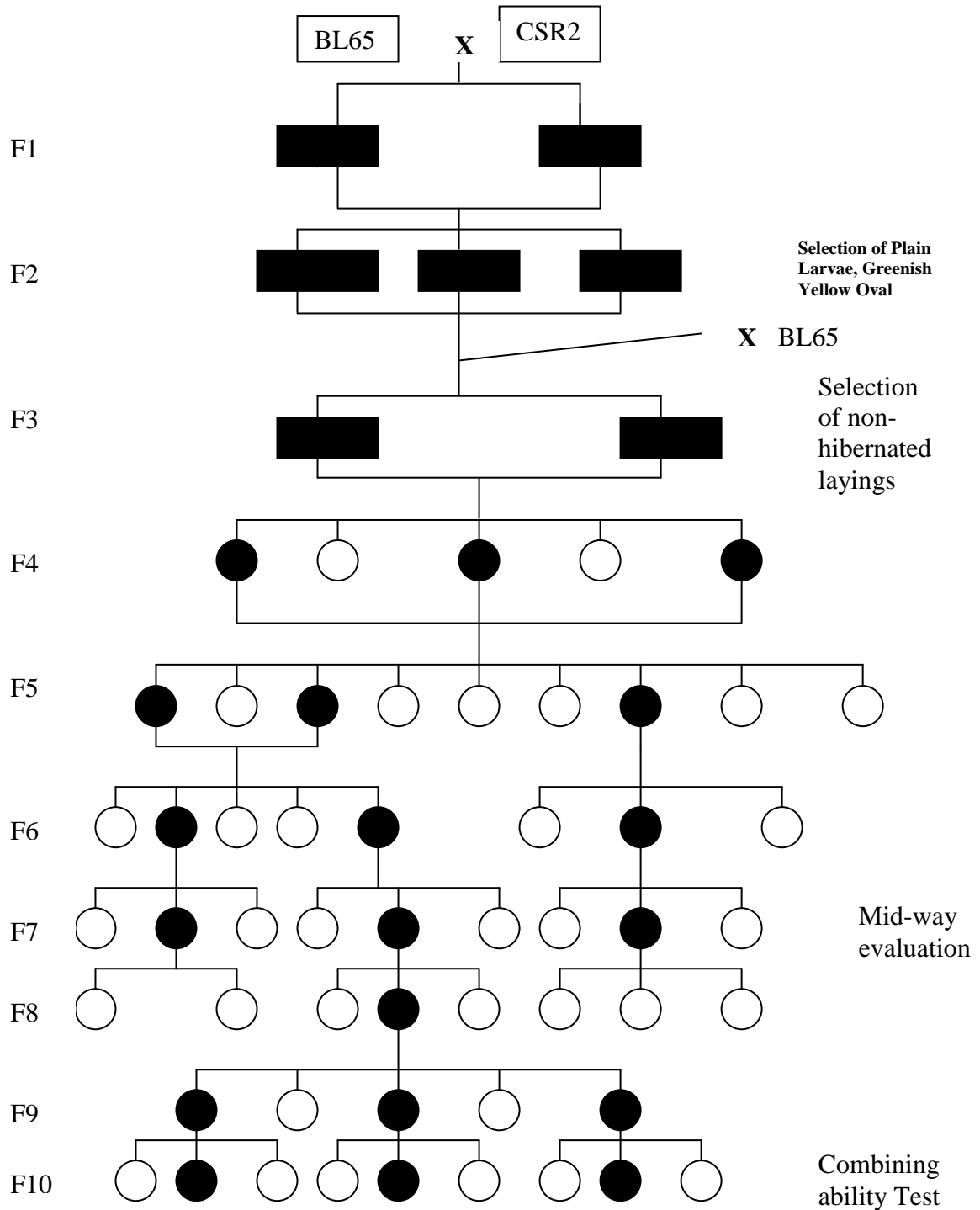
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
519 ±41	22:09 ±1:18	5:11 ±0:13	90.57 ±5.01	00	1.217 ±0.13	0.223 ±0.02	18.31 ±0.86	7.01 ±1.00	0.994 ±0.01	77.34 ±7.92

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
484 ±56	2.40 ±0.31	9.42 ±0.24	50.70 ±5.78	86.00 ±1.00	25.00 ±1.00	800 ±22	36.00 ± 4	64 ±4	17.30 ±3.0	1800 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



Cellular selected



Cellular non-selected

## 8. 2000H

### Parentage:

- 96H x CSR18

### Characteristics:

- Developed during 2000
- Developed for its high cocoon shell weight and fiber characters
- Eggs are yellow in color with light yellow Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, oval in shape with coarse to medium grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color

### Rearing and reeling traits:

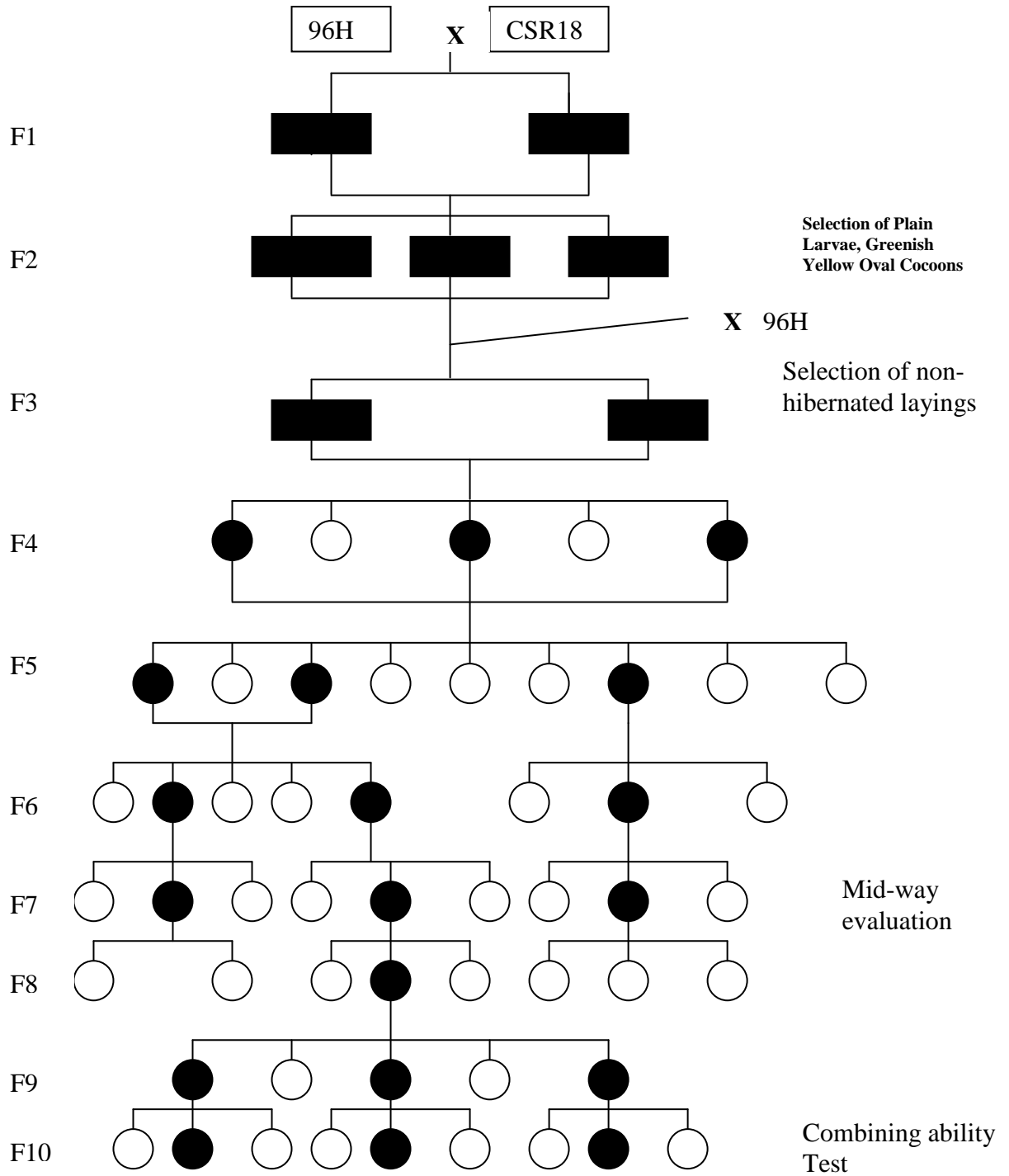
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
483 ±40	22:09 ±1:18	5:11 ±0:13	90.57 ±4.42	03	1.208 ±0.14	0.220 ±0.03	18.21 ±1.10	6.80 ±1.00	0.988 ±0.11	69.22 ±13.64

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
524 ±15	2.28 ±0.37	11.26 ±0.60	60.80 ±2.26	87.00 ±1.00	25.50 ±1.00	800 ±25	37.00 ± 3	65 ±2	7.87 ±2.23	1900 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



Cellular selected



Cellular non-selected

## 9. ND7

### Parentage:

- BL67 (BL24 x BL27), larvae with two prominent black eye spots on 2nd thoracic segment were selected and inbred

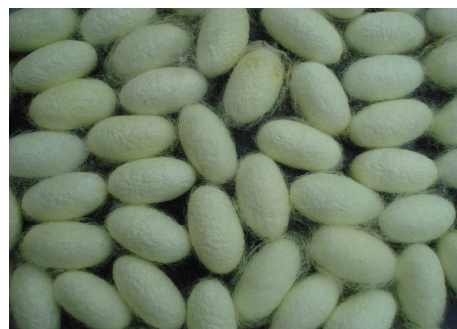
### Characteristics:

- Developed during 2003
- Developed for superior fiber quality (A-2A) and tolerant to high temperature
- Eggs are light yellow in color with light yellow Chorion and ellipsoidal in shape
- Larvae are plain with black eyespot on 2nd thoracic segment and bluish white in colour
- Cocoons are light greenish yellow in colour, oval in shape and having medium to coarse grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color
- Female parent for ND7 x CSR2 (Jayalakshmi), identified as improved crossbred for irrigated mulberry.

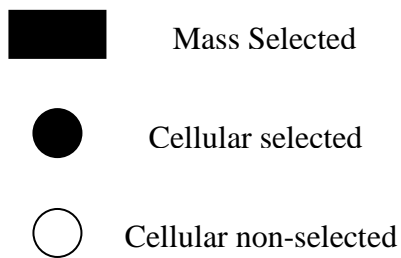
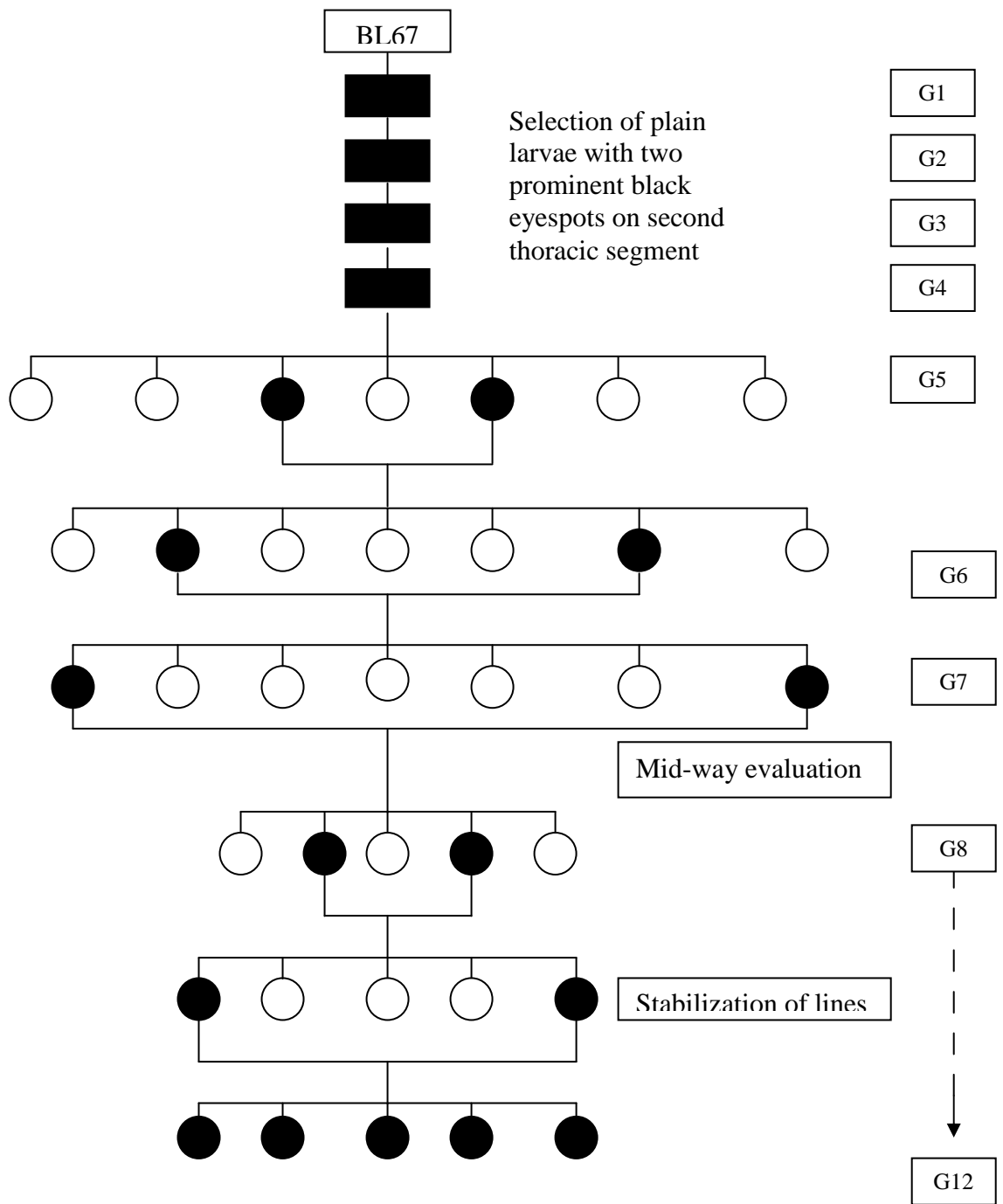
### Rearing and reeling traits:

Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)	
	Total	5 <sup>th</sup> age									
549 ±38	22:04 ±1:10	5:08 ±0:13	91.74 ±3.57	3.45 ±0.60	1.325 ±0.110	0.235 ±0.02	17.77 ±0.52	8.50 ±1.00	1.090 ±0.09	77.63 ±5.99	
FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
554 ±69	2.45 ±0.42	10.94 ±1.22	62.41 ±6.52	86.00 ±1.00	25.35 ±1.15	750 ±20	37.00 ± 2	63 ±5	1.06 ±0.67	1855 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



## 10. NDV6

### Parentage:

- 2000H x C.Nichi

### Characteristics:

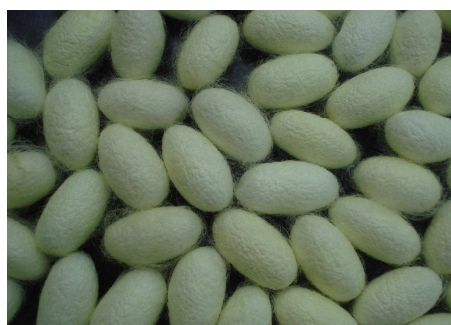
- Developed during 2005
- Developed for tolerant to BmDENV1 (Denso Nucleosis Virus)
- Eggs are light yellow in color with light yellow Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, short oval in shape and having medium grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color
- Female parent for NDV6 x CSR2 and NDV6 x CSR51, identified as improved crossbreeds for irrigated mulberry

### Rearing and reeling traits:

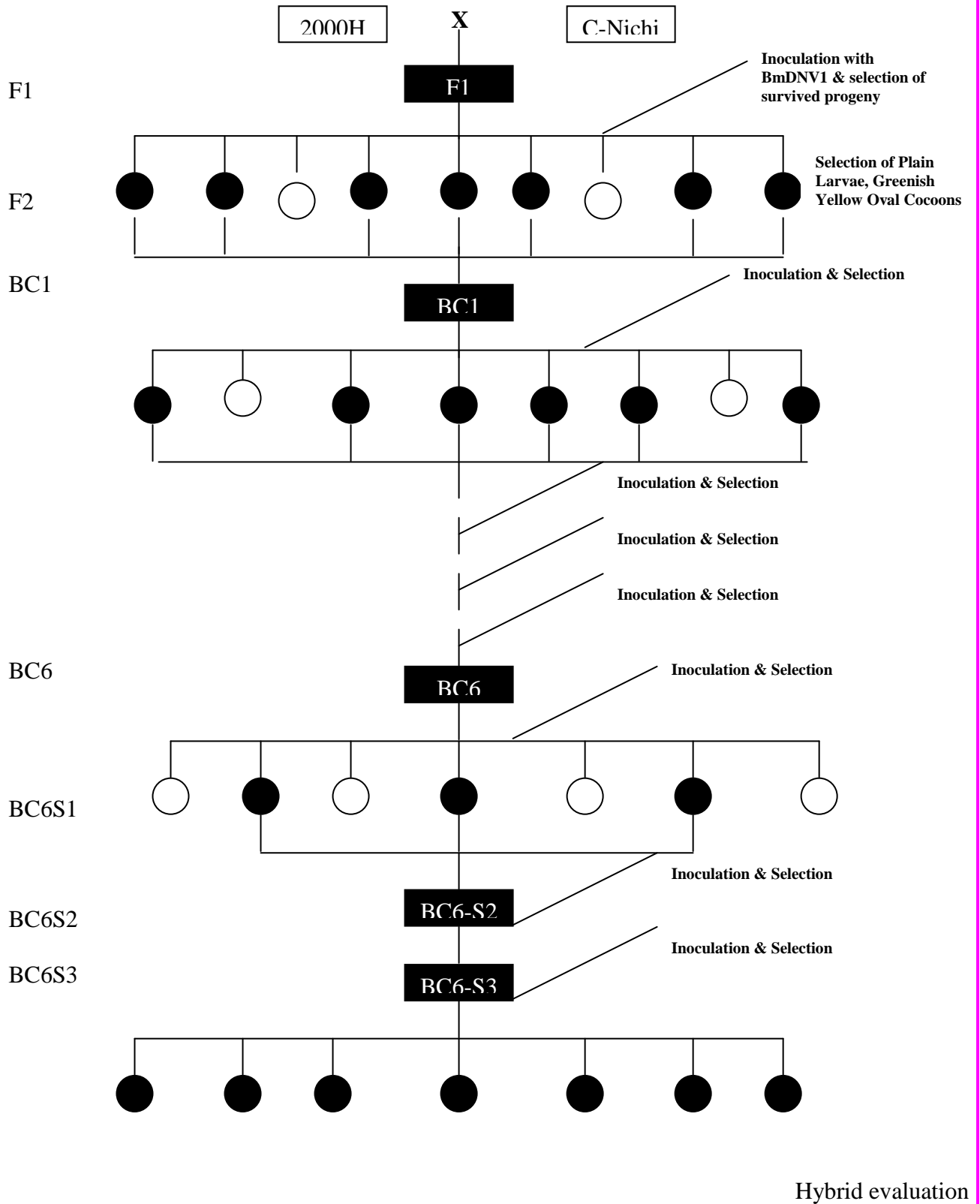
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
536 ±38	22:05 ±1:07	5:10 ±0:12	92.23 ±2.35	5.26 ±0.26	1.279 ±0.13	0.234 ±0.02	18.33 ±0.66	7.50 ±1.00	1.045 ±0.11	78.47 ±8.95

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
528 ±95	2.39 ±0.53	10.76 ±1.81	56.06 ±8.50	86.00 ±1.00	24.35 ±1.25	760 ±20	39.00 ± 2	65 ±5	5.92 ±1.00	1856 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



Back Crossing with recurrent parent and inoculation in alternate generations and selection of survived progeny

## 11.ND5

### Parentage:

- BL67 x MAR

### Characteristics:

- Developed during 2005
- Developed for robustness and tolerant to high temperature
- Eggs are light yellow in color with white Chorion and ellipsoidal in shape
- Larvae are plain and bluish tinge in colour
- Cocoons are greenish yellow in colour with oval round ends in shape and having medium grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color

### Rearing and reeling traits:

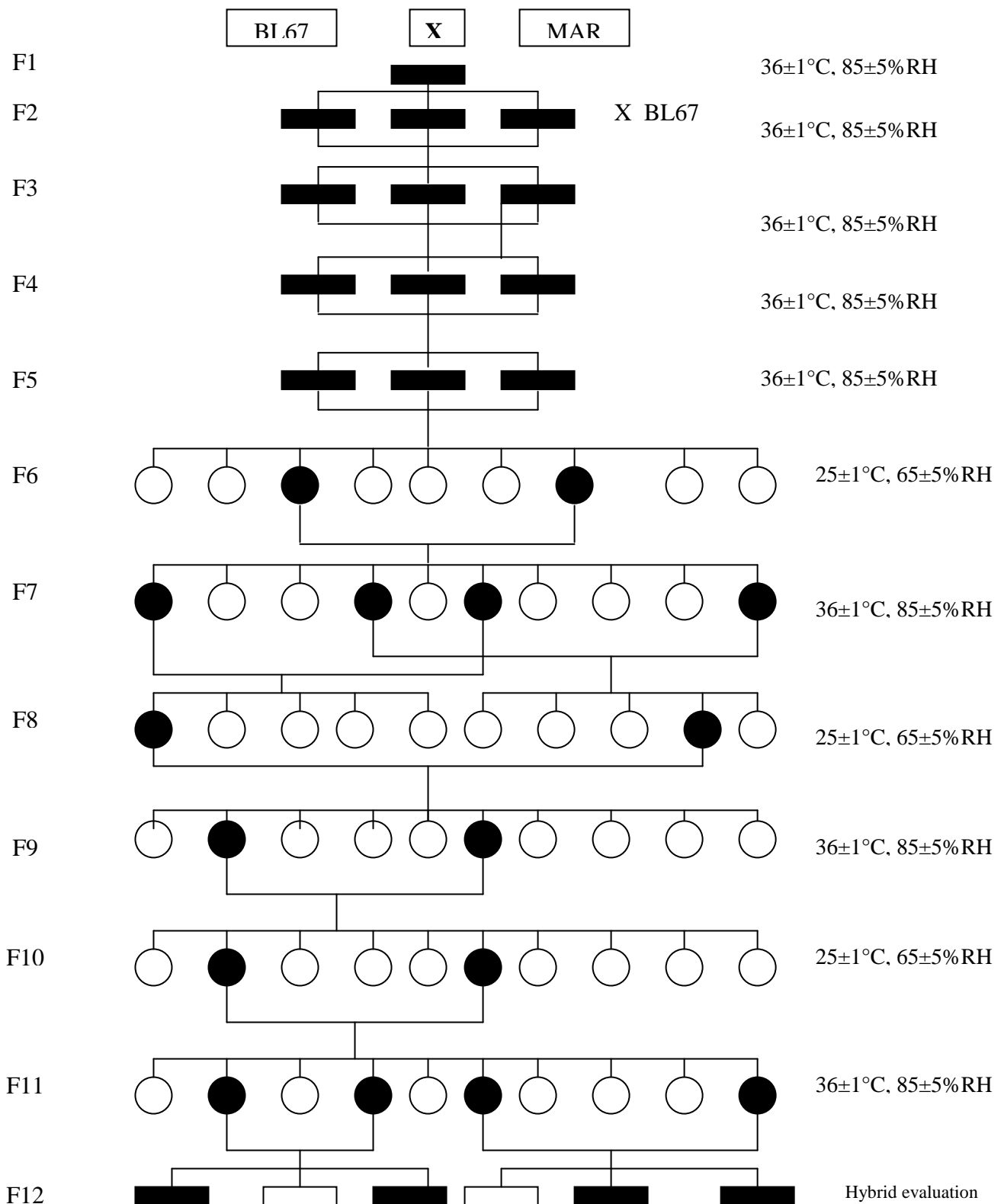
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
512 ±50	21:22 ±1:06	5:07 ±0:11	90.75 ±3.65	3.25 ±0.20	1.306 ±0.11	0.226 ±0.02	17.33 ±0.70	8.50 ±1.00	1.08 ±0.09	78.07 ±7.45

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
535 ±124	2.59 ±0.26	11.52 ±1.80	65.94 ±10.00	87.00 ±2.00	25.30 ±1.20	750 ±20	39.00 ± 2	62 ±3	0.00	1865 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



## 12. NP1

### Parentage:

- BL69 x MAR

### Characteristics:

- Developed during 2005
- Developed for tolerant to high temperature and BmNPV
- Eggs are yellow in color with yellow Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, elongated oval in shape with medium grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color

### Rearing and reeling traits:

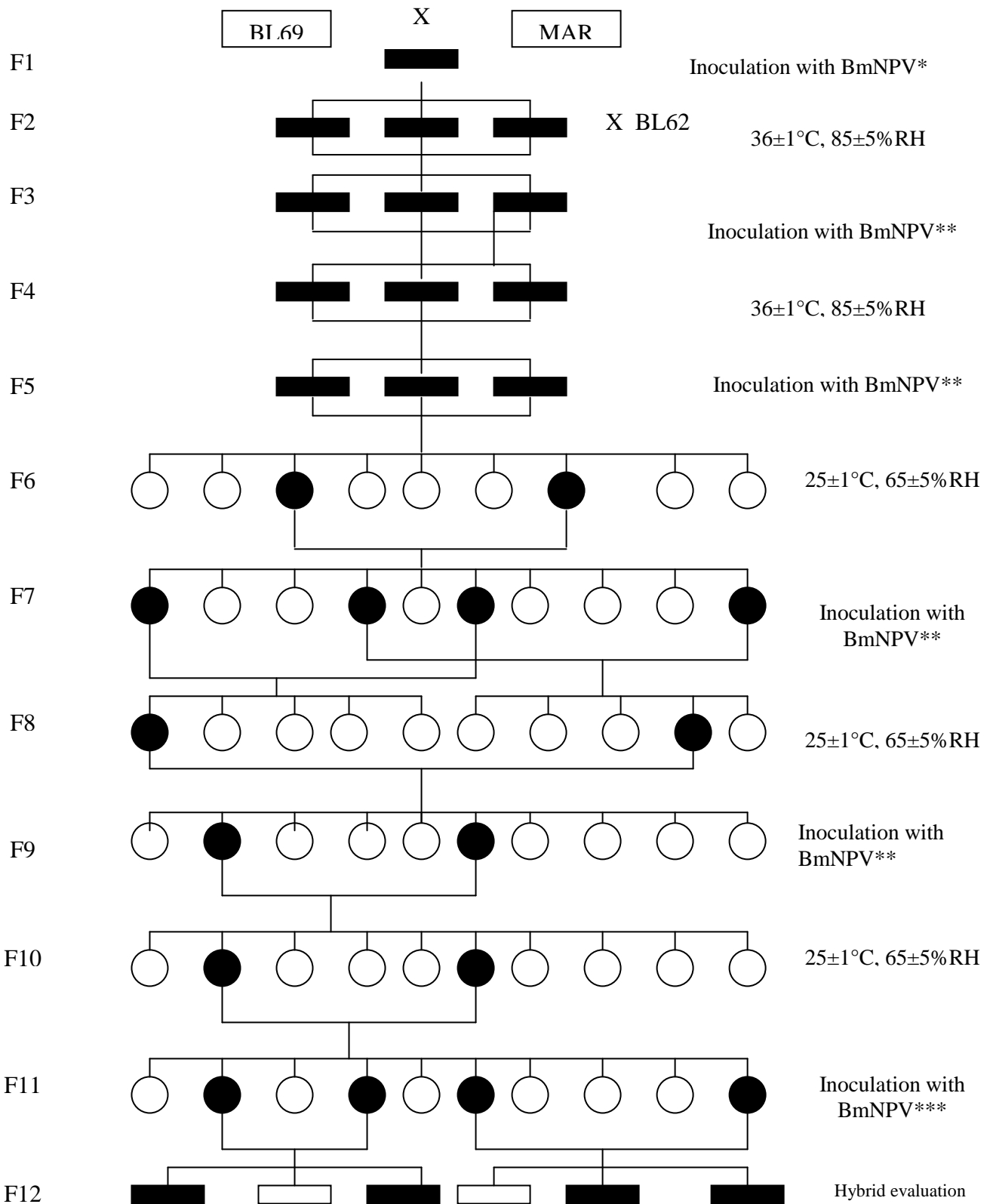
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
488 ±60	21:21 ±1:05	5:09 ±0:11	90.95 ±4.21	1.33 ±0.08	1.232 ±0.14	0.224 ±0.03	18.18 ±0.90	8.30 ±1.50	1.008 ±0.12	74.14 ±11.28

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
523 ±90	2.62 ±0.5	11.23 ±2.07	64.36 ±12.00	86.00 ±2.00	24.98 ±1.21	800 ±20	40.00 ± 2	65 ±4	1.50	1900 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



\*:  $1.5 \times 10^7$  POB/100 larvae; \*\*:  $2.5 \times 10^7$  POB/100 larvae; \*\*\*:  $3.0 \times 10^7$  POB/100 larvae



## 13. AGL3

### Parentage:

- BL68

### Characteristics:

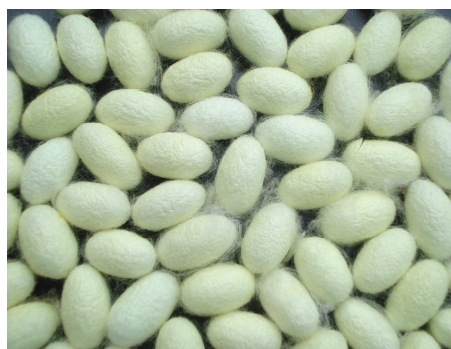
- Developed during 2008
- Developed through application of Androgenesis coupled with conventional breeding
- Eggs are yellow in color with yellow Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, oval in shape with medium grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color

### Rearing and reeling traits:

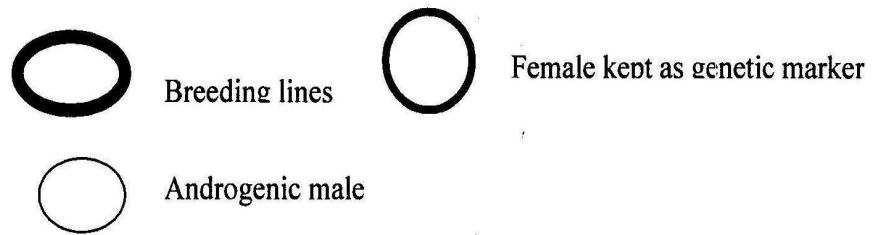
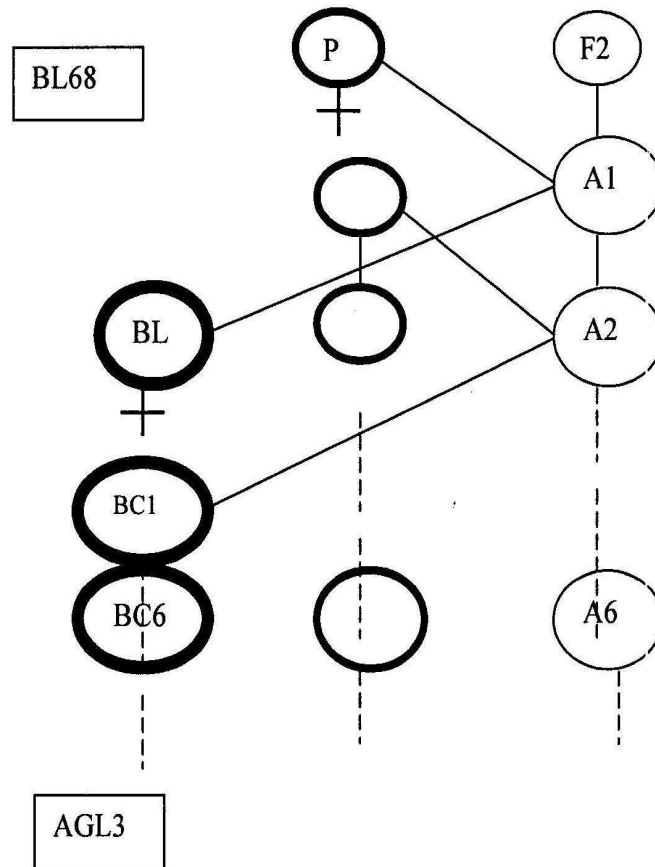
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
513 ±45	22.03 ±1.09	5:10 ±0:12	88.84 ±5.71	0.17 ±0.06	1.279 ±0.15	0.227 ±0.03	17.73 ±0.90	7.00 ±1.00	1.052 ±0.12	78.72 ±6.75

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
615 ±84	2.61 ±0.28	11.82 ±1.45	66.64 ±3.40	85.00 ±1.00	25.91 ±1.25	780 ±20	38.00 ± 2	62 ±4	0.35 ±0.22	1850 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



## 14. AGL5

### Parentage:

- DNP5

### Characteristics:

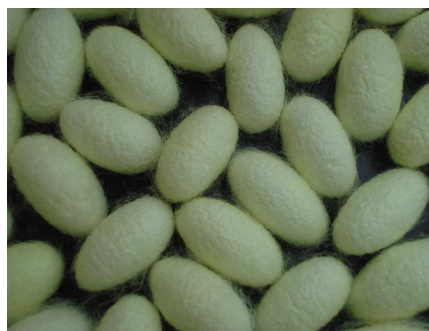
- Developed during 2008
- Developed through application of Androgenesis coupled with conventional breeding
- Eggs are yellow in color with yellow Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, oval in shape with medium grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color

### Rearing and reeling traits:

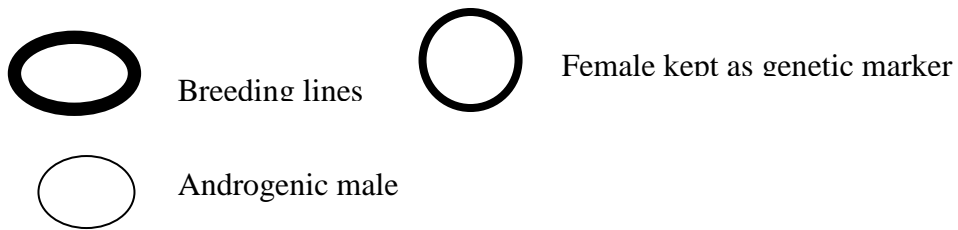
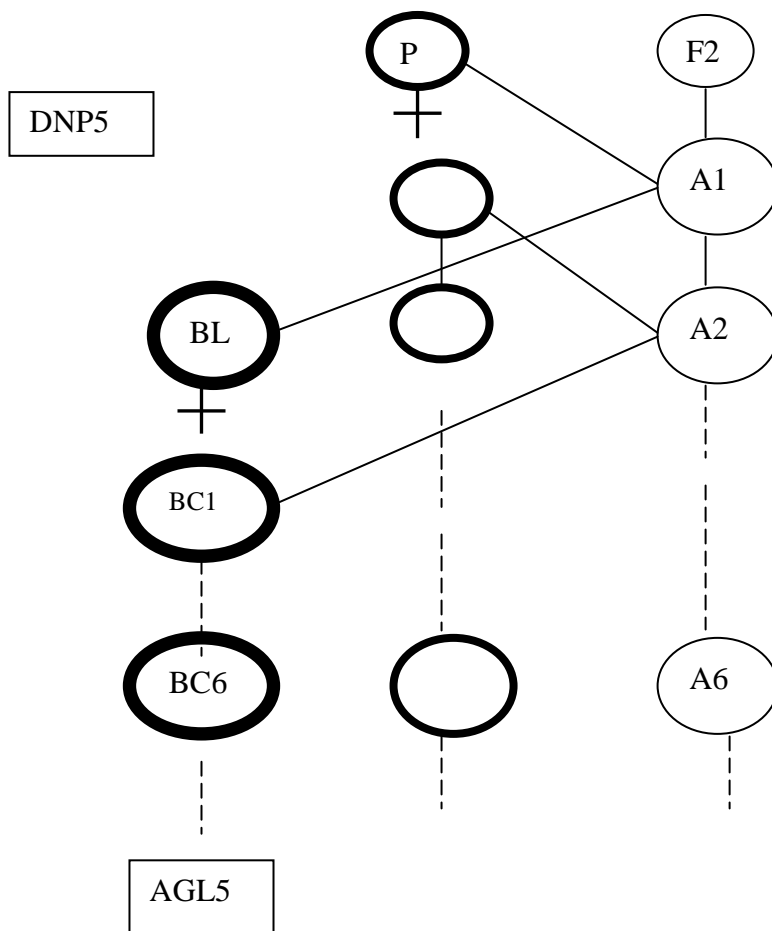
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
507 ±40	22.03 ±1:09	5:10 ±0:12	89.68 ±4.12	0.05 ±0.01	1.251 ±0.12	0.227 ±0.03	18.11 ±0.92	7.20 ±1.00	1.025 ±0.10	77.08 ±7.74

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
634 ±38	2.45 ±0.22	12.56 ±1.64	65.11 ±9.86	87.00 ±2.00	26.91 ±1.30	780 ±20	39.00 ± 2	62 ±3	1.04 ±0.5	1849 ±100	12:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



## 15. L14

### Parentage:

- [ND7 x NDV6] x [NP1 x 2000H]

### Characteristics:

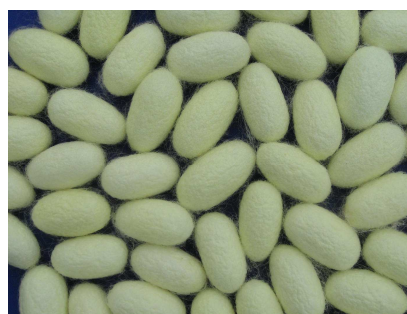
- Developed during 2011
- Developed for superior fiber quality
- Eggs are light yellow in color with light yellow Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, oval in shape with medium to fine grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color
- Good combiner with CSR2 and CSR50 for the production of L14 x CSR2 and L14 x CSR50, improved cross breeds with superior fiber quality (2A~3A)

### Rearing and reeling traits:

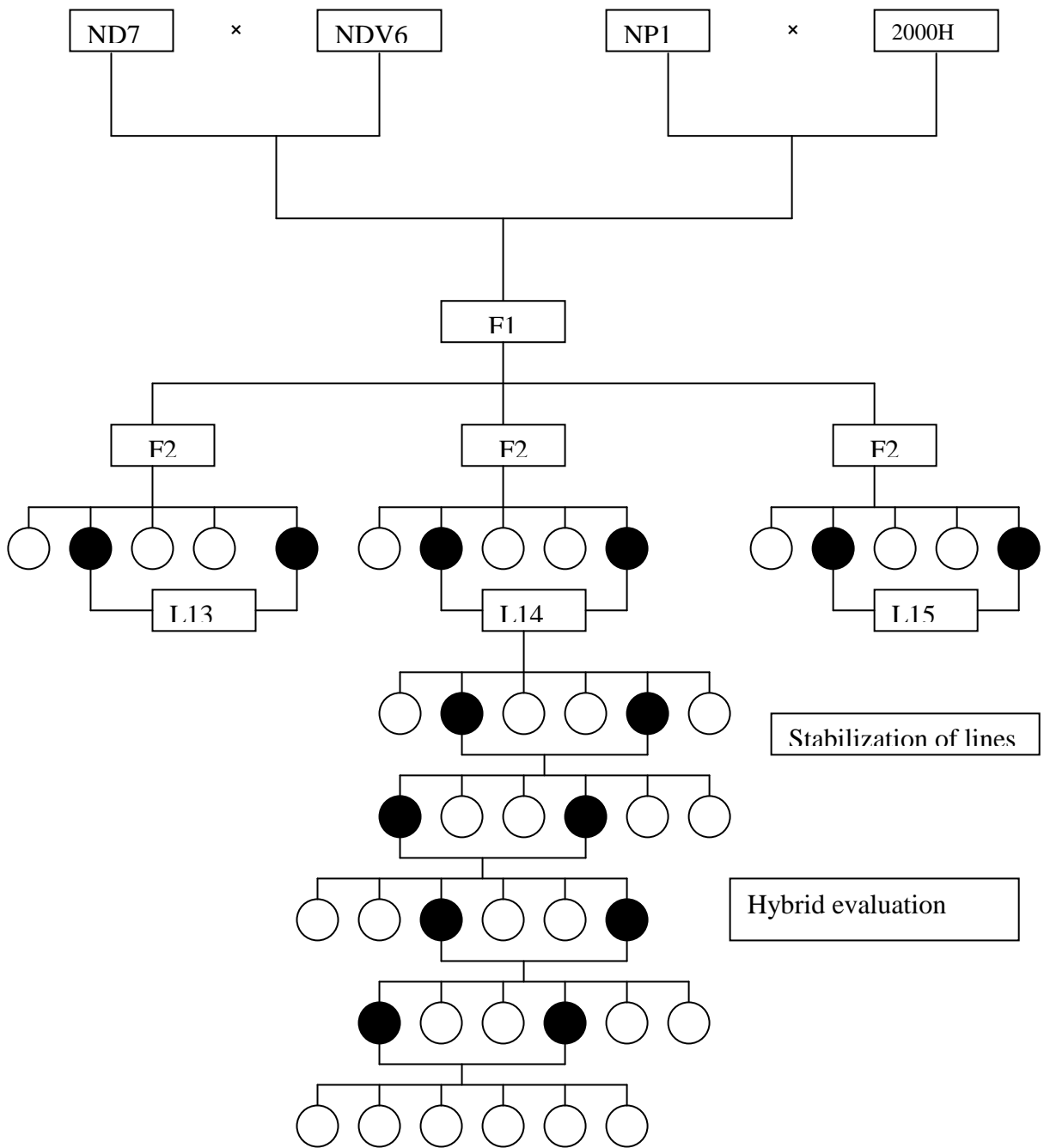
Eggs/ Dfl	LD (D:H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
538 ±45	21:22 ±1:10	5:09 ±0:05	91.84 ±2.78	3.14 ±2.33	1.310 ±0.120	0.244 ±0.02	18.48 ±0.63	7.41 ±1.00	1.059 ±0.08	79.40 ±1.30

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D:H)
							%	Wt. (g)			
645 ±81	2.35 ±0.36	12.44 ±1.24	62.77 ±6.18	86.36 ±1.49	25.00 ±1.00	675 ±25	40 ± 2	70 ±5	5.60 ±5.2	1800 ±100	13:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



□ Mass Selected    ● Cellular selected    ○ Cellular non-selected

## 16. L15

### Parentage:

- [ND7 x NDV6] x [NP1 x 2000H]

### Characteristics:

- Developed during 2011
- Developed for superior fiber quality
- Eggs are light yellow in color with light yellow Chorion and ellipsoidal in shape
- Larvae are plain and bluish white in colour
- Cocoons are light greenish yellow in colour, oval in shape with medium to fine grains.
- Pupae are brown in color and elliptical in shape
- Adults are creamy white in color

### Rearing and reeling traits:

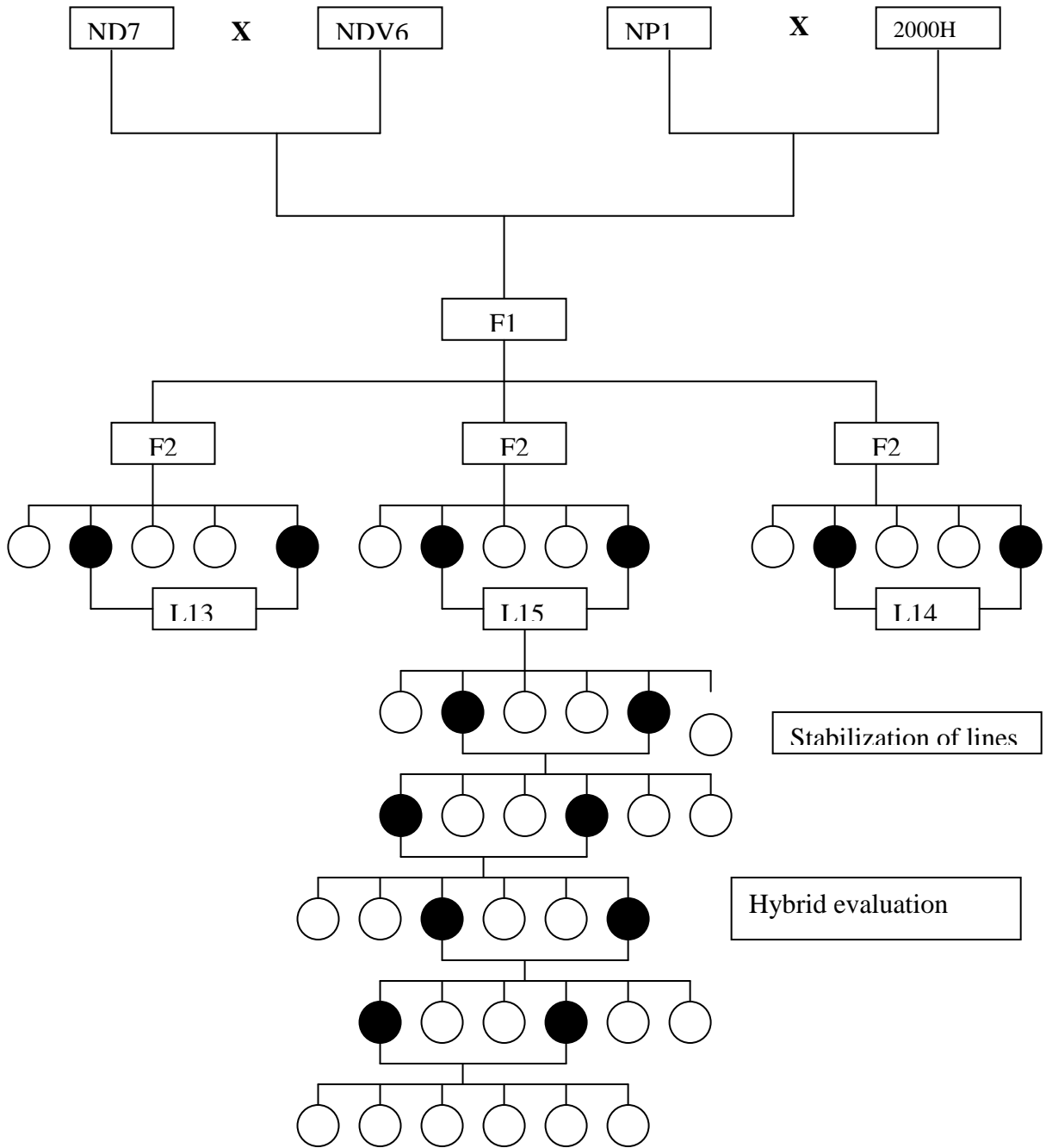
Eggs/ Dfl	LD (D: H)		Pupation (%)	TM (%)	SCW (g)	SSW (g)	Shell (%)	Floss (%)	SPW (g)	Reel (%)
	Total	5 <sup>th</sup> age								
509 ±52	22:01 ±1:12	5:08 ±0:14	91.06 ±4.52	2.63 ±0.65	1.280 ±0.120	0.235 ±0.02	18.37 ±0.81	8.50 ±1.00	1.044 ±0.10	75.00 ±2.00

FL (m)	FS (d)	RS (%)	RSR (%)	Neatness (%)	BOL (%)	Coc /kg	Egg recovery		Hib %	Grains / g	Pupal duration (D: H)
							%	Wt. (g)			
584 ±52	2.54 ±0.22	13.03 ±1.35	63.44 ±6.02	87.00 ±2.00	24.30 ±1.00	700 ±25	38.00 ± 2	68 ±6	5.57 ±1.67	1850 ±100	13:00 ±1:00

### Larvae and Cocoons:



**Breeding Plan:**



Mass Selected
  Cellular selected
  Cellular non-selected

## ABBREVIATIONS

#	Abbreviation	Expansion	#	Abbreviation	Expansion
1	LD	Larval Duration	9	FL	Filament length
2	D	Days	10	FS	Filament size
3	H	Hours	11	RS	Raw silk
4	TM	Trimoulters	12	RSR	Raw silk recovery
5	SCW	Single cocoon weight	13	BOL	Boil off loss
6	SSW	Single shell weight	14	Coc	Cocoons
7	SPW	Single pupal weight	15	Hib	Hibernation
8	Reel	Reelability			

## **Breeders / Experts contributed towards development of silkworm breeds**

- 1. Dr. R.K. Datta**
- 2. Dr. S.B. Dandin**
- 3. Dr. C.K. Kamble**
- 4. Dr. S.M.H. Qadri**
- 5. Dr. B.B. Bindroo**
- 6. Dr. M.M. Ahsan**
- 7. Dr. K.P. Jayaswal**
- 8. Dr. B.K. Kariyappa**
- 9. Dr. H.K. Basavaraja**
- 10. Dr. S. Nirmal Kumar**
- 11. Dr. P.G. Joge**
- 12. Dr. Ravindra Singh**
- 13. Dr. P. Rama Mohana rao**
- 14. Ms. V. Premalatha**
- 15. Dr. D. Raghavendra Rao**
- 16. Dr. V.N. Sudha**
- 17. Dr. Dayananda**
- 18. Dr. K. Umadevi**
- 19. Dr. S.N. Pallavi**
- 20. Mr. C. Parameswara**
- 21. Dr. R. Nirupama**
- 22. Dr. D. Gangopadhyay**
- 23. Dr. B. Nataraju**
- 24. Dr. S.D. Sharma**
- 25. Dr. Balavenkatasubbaiah**
- 26. Dr. P. Sudhakar Rao**
- 27. Dr. K. Chandrashekar**
- 28. Mr. S. Sangappa**
- 29. Mr. K.P. Shivakumar**



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**Dr. B.B. Bindroo**  
**Director**

**Central Sericultural Research & Training Institute,**

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Manandavadi Road, Srirampura, Mysore – 570 008

Website [www.csrtimys.res.in](http://www.csrtimys.res.in) + email: [csrtimys.csb@nic.in](mailto:csrtimys.csb@nic.in)

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