

# INCIDENCE, INTENSITY OF ATTACK AND CONTROL OF THE BAMBOO BORER, *Phloeobius crassicollis* Jord.



**Dr. K.P. Singh  
Scientist**

**Forest Research Institute  
Dehradun, India**

Indian Council of Forestry Research and Education  
(Ministry of Environment, Forest and Climate Change, GoI)

(email: [singhkp@icfre.org](mailto:singhkp@icfre.org), Web: [www.icfre.org](http://www.icfre.org))

# INDIAN COUNCIL OF FORESTRY RESEARCH & EDUCATION

HFRI, Shimla



AFRI, Jodhpur

TFRI, Jabalpur

IWST, Bangalore



INDIA  
States and Union Territories

RFRI, Jorhat

FRI, Dehradun

IFP, Ranchi

IEGTB, Coimbatore

Map not to Scale

# DISTRIBUTION OF BAMBOO

## GLOBAL SCENARIO

- Genera-75
- Species- 1250
- Tropical, Sub-Tropical and Temperate Zone  
Africa, Asia, Central and South America



## INDIAN SCENARIO

- Genera-23
- Species- 125
- North-Eastern India alone reports about 66% of growing stock



Family  
Poaceae

Sub-family  
Bambusoideae

## FEW IMPORTANT FACTS

- An arborescent plant of Global Interest
- Its known as '**GREEN GOLD**' for its fast growth rate
- The name originated from Malay word '**MAMBU**'
- Bamboos occur naturally in four of the five continents, except Europe
- The Global consumption has been calculated to approx. 2 million tonne
- China is the maximum producer to the tune of about 1.3 million tonne
- There are about 1500 documented traditional uses of bamboos

# IMPORTANT USES

- Housing and agricultural implements
- Pulp and paper, domestic commodities and in cottage industries
- Vegetable and pickles
- Employment in small cottage industries

■ It is estimated that about 2.5 billion people depend on use of bamboo

■ Estimated value of US\$ 7 billion per annum



# BAMBOOS : THE WONDERFUL GIFT OF NATURE



Bamboo Handicraft



Bamboo Hut



Bamboo Bridge



Activated Charcoal



Bamboo Furniture

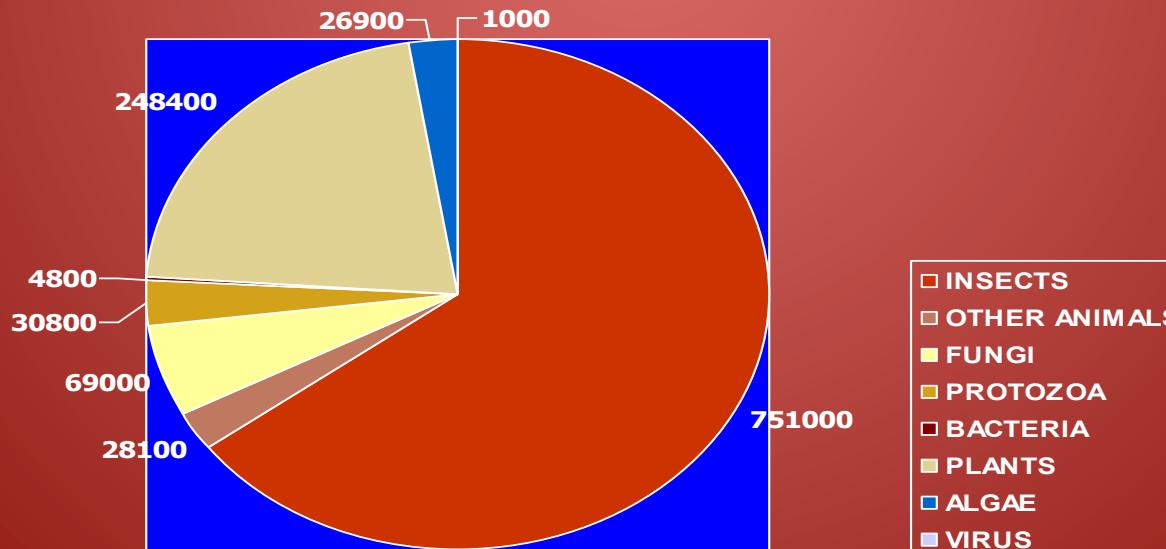


Conc. vinegar used as insecticide

# THE INSECT

- The most dominating group occupying highest position in the whole animal kingdom
- Insects play decisive role in forest productivity, resources and products
- Affect growth increment, even lead to death of the tree as well as its products

No. OF ORGANISMS ON EARTH 1413000 (APPROX.)



# LOSSES CAUSED BY FOREST INSECTS

Forest Crop	Per cent damage	Insect pest responsible	Estimated loss (INR in million per unit area / vol.)	Authority
Nurseries	93.5	White grubs	0.45 per ha	Vaishampayan & Bhandari, 1981
<b>Forests and Plantations</b>				
Eucalyptus	05.0	Stem borer and termites	0.0024 per ha	Forest Research Institute, India (Unpublished)
Teak	13-65	Teak defoliators	0.05 per ha	Champion, 1934
<b>Timber</b>				
Industrial wood	10.0	Wood borers and termites	332.27 for 7.97 millions m <sup>3</sup>	Purushotham, 1970
Bamboo	25-40	Ghoon borers	2.81 for 0.15 million koris (20 no.)	Beeson, 1941 as well as present records of FRI, India

# INSECT PESTS OF BAMBOOS

(Insect species in Indian Sub-Continent - 212)

■ **Nursery pest** - 05



■ **Defoliators** - 48



■ **Termites** - 13



■ **Sapsuckers** - 90



■ **Borers** - 56

■ **Borers on felled / dried bamboo-** 44

■ **Culm and shoot borers** - 12

# BORERS ON FELLED /DRY BAMBOOS

- ◆ *Dinoderus ocellaris*
- ◆ *Dinoderus minutus*
- ◆ *Dinoderus brevis*
- ◆ *Lyctus africanus*
- ◆ *Chlorophorus annularis*
- ◆ *Stromatium barbatum*

**Coleoptera: Bostrichidae**

**Coleoptera: Lyctidae**

**Coleoptera: Cerambycidae**



# SHOOT AND CULM BORERS OF BAMBOOS

❖ ***Cyrtotrachelus dux***  
(Coleoptera: Curculionidae)



❖ ***Estigmena chinensis***  
(Coleoptera: Chrysomelidae)

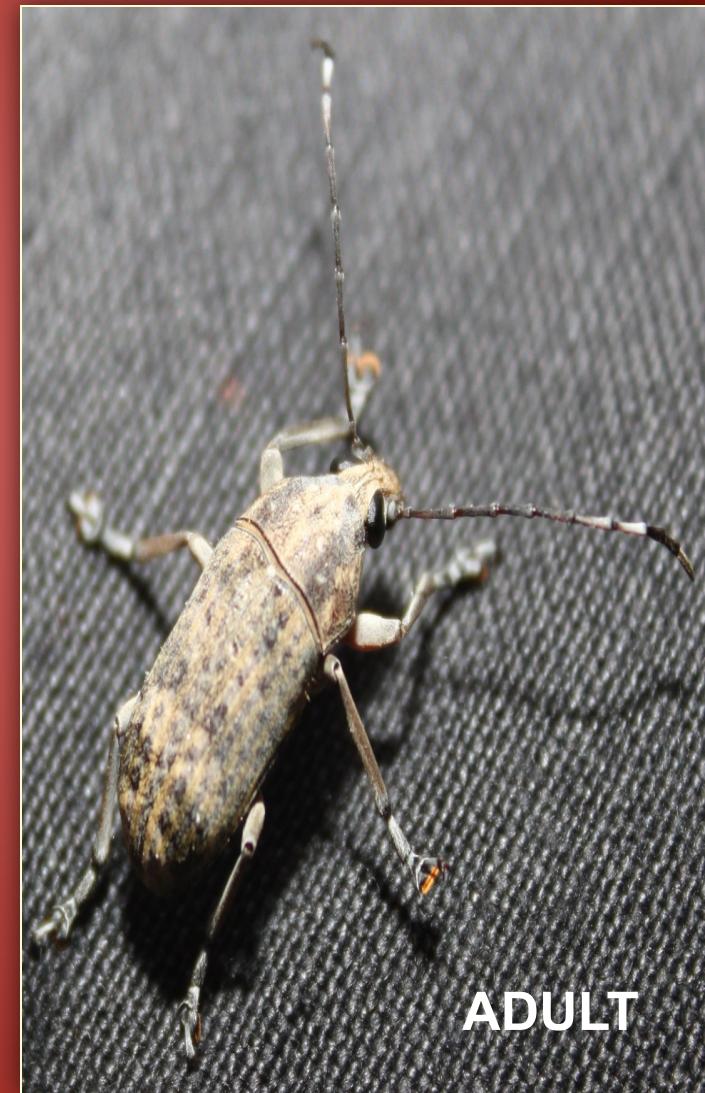
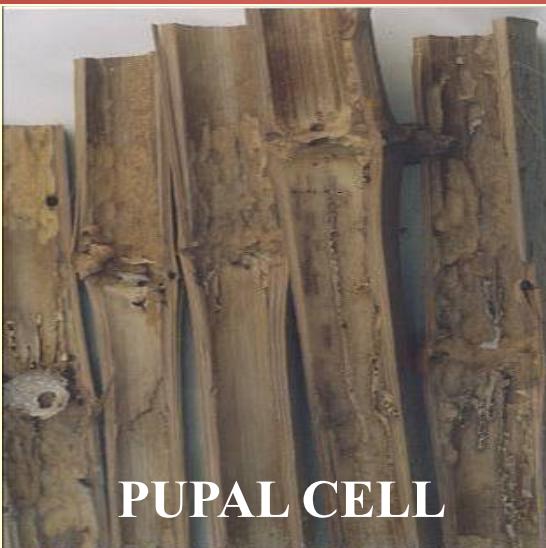
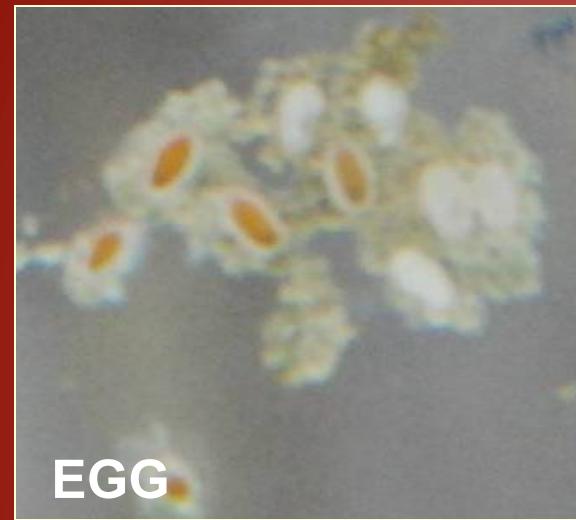


❖ ***Phloeobius crassicollis***  
(Coleoptera: Anthribidae)



# BAMBOO BORER

*Phloeobius crassicollis*  
(Coleoptera- Anthribidae)



# *Phloeobius crassicollis*

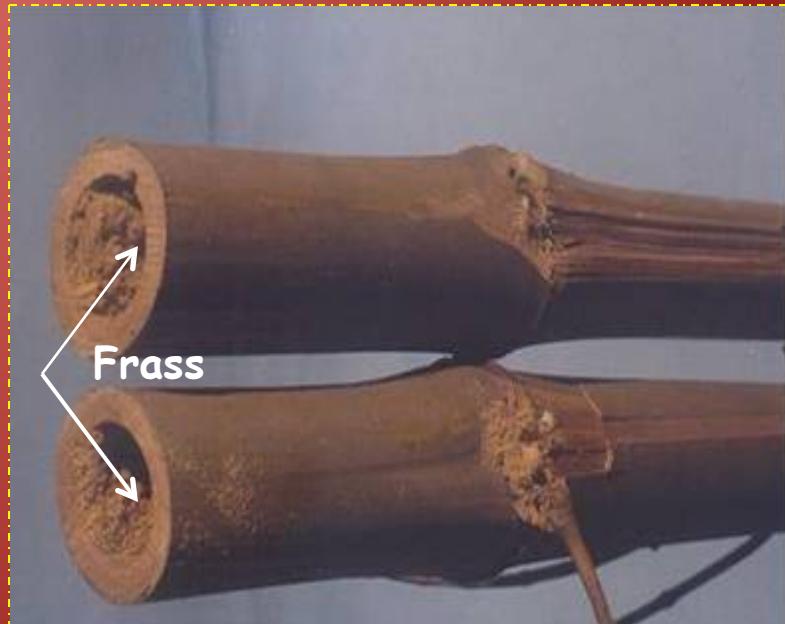
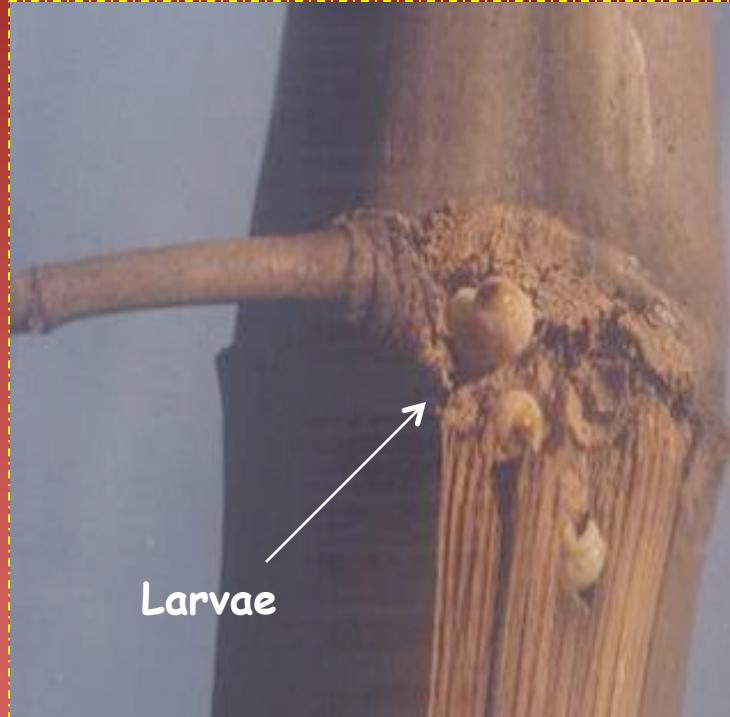
- Emergence of beetle in May-June
- Eggs laid at nodes/culm sheaths
- Larval period is more than 300 days



- First record on green standing bamboo species.
- Earlier reported only on felled bamboo (*Dendrocalamus strictus*)

# FEEDING PATTERN (LARVA)

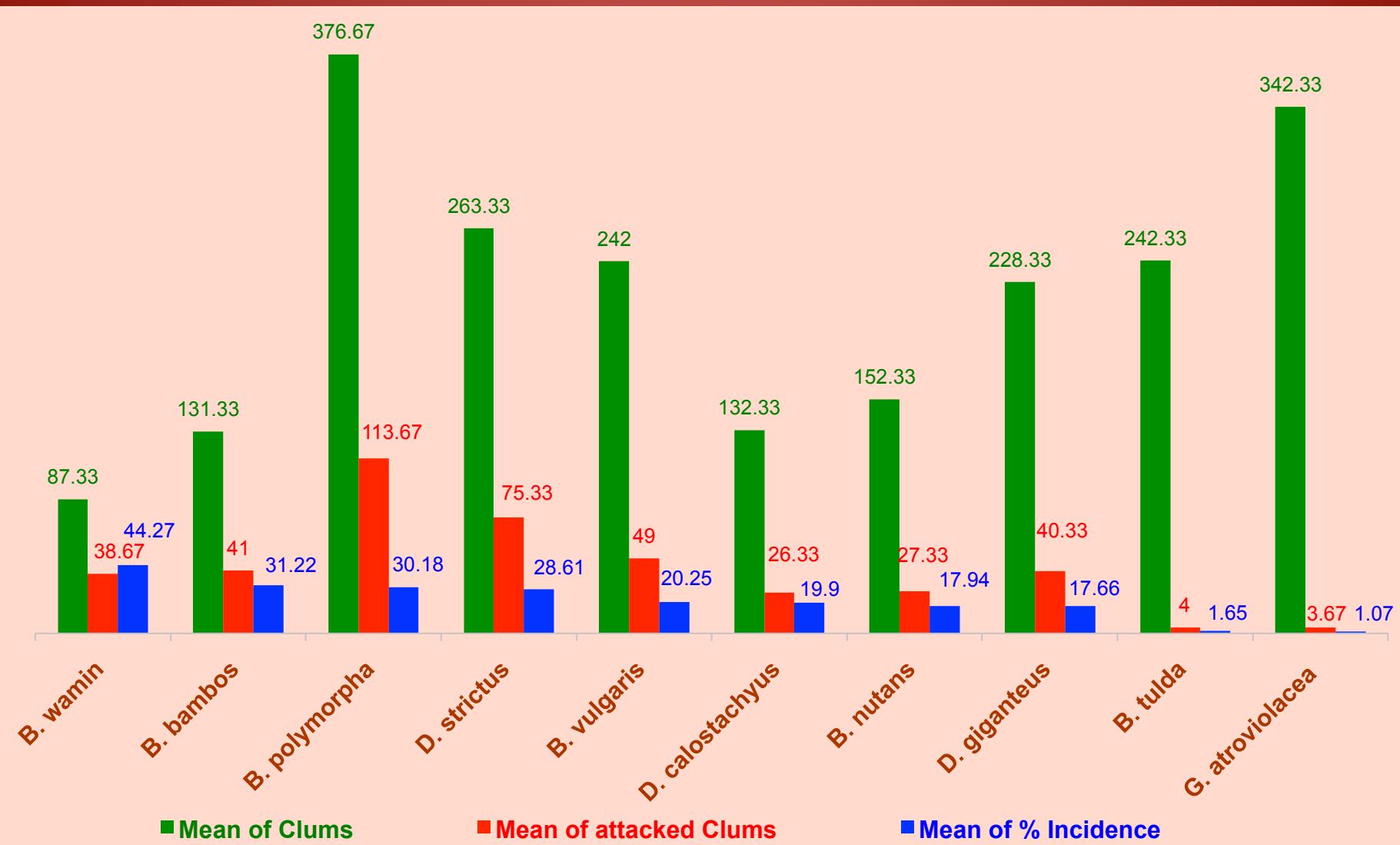
- Freshly hatched larvae nibble and scratch at the point of hatching on the nodes/culms sheaths
- At later stage, larvae feed on woody tissues of nodes and internodes to deposit larval frass inside hollow internodes



# INCIDENCE AND INTENSITY OF ATTACK

Bamboo species	Mean No. of culms	Incidence of attack (Mean)		Mean No. of holes	Intensity / Category of attack
		No. of attacked culms	% of incidence		
<i>Bambusa wamin</i>	087.33	38.67	44.27±1.15	124.00	High
<i>Bambusa bambos</i>	131.33	41.00	31.22±0.46	91.33	High
<i>Bambusa polymorpha</i>	376.67	113.67	30.18±1.63	254.00	High
<i>Dendrocalamus strictus</i>	263.33	75.33	28.61±2.59	178.00	High
<i>Bambusa vulgaris</i>	242.00	49.00	20.25±0.97	65.67	Moderate
<i>Dendrocalamus calostachyus</i>	132.33	26.33	19.90±1.90	34.67	Moderate
<i>Bambusa nutans</i>	152.33	27.33	17.94±0.22	38.33	Moderate
<i>Dendrocalamus giganteus</i>	228.33	40.33	17.66±0.49	75.00	Moderate
<i>Bambusa tulda</i>	242.33	4.00	01.65±0.41	2.33	Low
<i>Gigantochloa atroviolacea</i>	342.33	3.67	01.07±0.11	1.67	Low

# INCIDENCE OF ATTACK



1. *Bambusa bambos*
2. *Bambusa nutans*
3. *Bambusa polymorpha*
4. *Bambusa tulda*
5. *Bambusa vulgaris*
6. *Bambusa wamin*
7. *Dendrocalamus calostachyus*
8. *Dendrocalamus giganteus*
9. *Dendrocalamus strictus*
10. *Gigantochloa atroviolacea*



# Chemical Control

## INSECTICIDES USED

**Contact insecticides (4)** : Cypermethrin, Deltamethrin, Endosulphan and Chlorpyriphos

**Systemic insecticides (3)** : Monocrotophos, Dimethoate and Imidachloprid

**Method used** : Internodal injection method

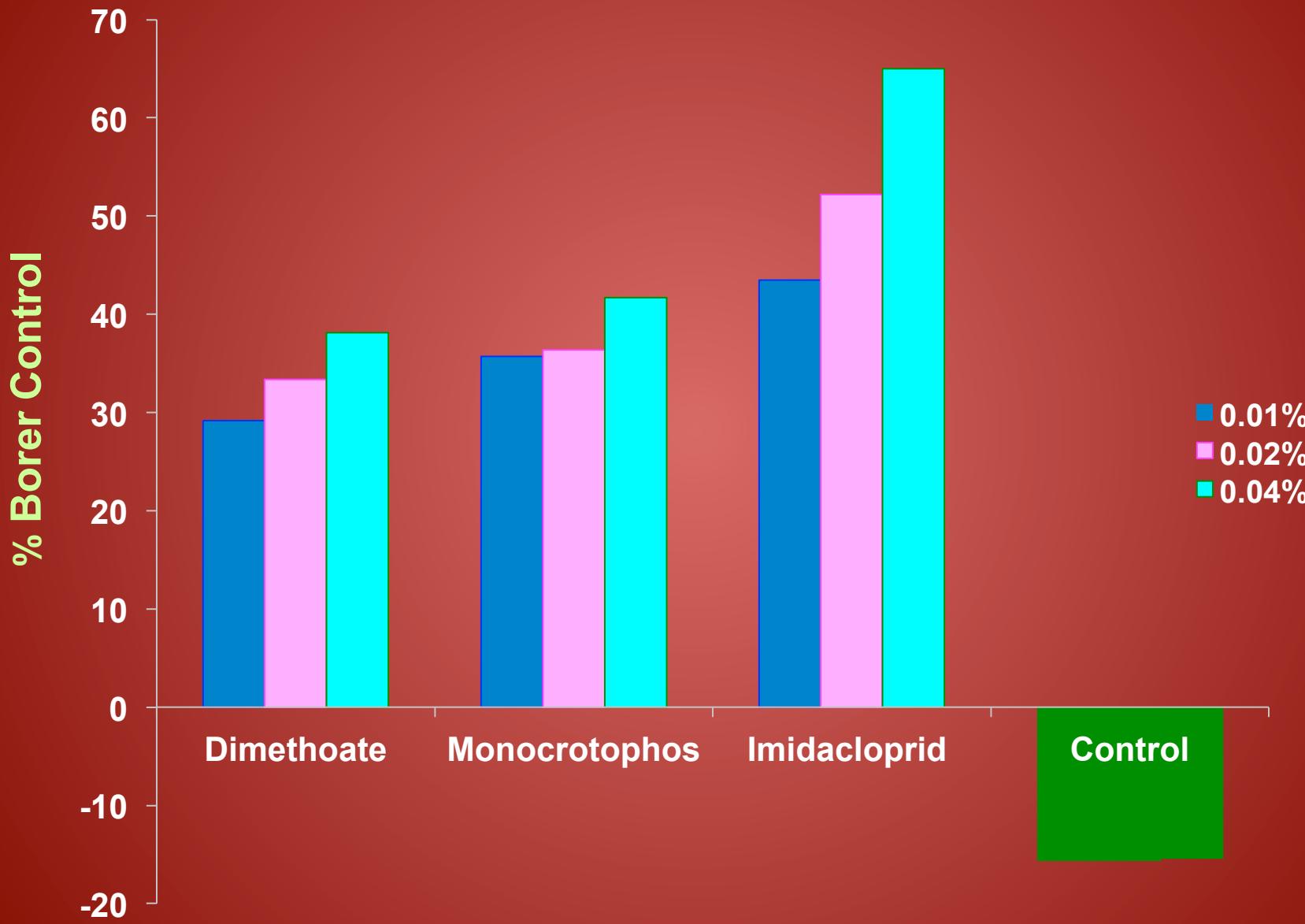
**Concentrations** : 0.01%, 0.02% and 0.04%

# CHEMICAL CONTROL : SYSTEMIC INSECTICIDES

Insecticides	% of Dosages	Treatment	Mean No. of culms	Pre treatment observation (Mean)		Post treatment observation (Mean)		Average % borer Control
				No. of attacked culms	Initial % of attack	No. of attacked culms	Remained % of attack	
Dimethoate 30 EC	0.01	T1	41.00	8.00	19.51	5.67	13.82	29.17 <sup>a</sup> ± 8.13
	0.02	T2	27.00	5.00	18.52	3.33	12.35	33.33 <sup>a</sup> ± 7.51
	0.04	T3	40.67	7.00	17.12	4.33	10.66	38.10 <sup>a</sup> ± 4.76
Monocrotophos 36 EC	0.01	T4	25.00	4.67	18.67	3.00	12.00	35.71 <sup>a</sup> ± 8.66
	0.02	T5	42.33	7.33	17.32	4.67	11.02	36.36 <sup>a</sup> ± 3.36
	0.04	T6	37.00	8.00	21.62	4.67	12.61	41.67 <sup>ab</sup> ± 2.58
Imidachloprid 17.8 SL	0.01	T7	34.00	7.67	22.55	4.33	12.75	43.48 <sup>ab</sup> ± 0.79
	0.02	T8	42.67	7.67	17.97	3.67	8.50	52.17 <sup>bc</sup> ± 11.56
	0.04	T9	44.67	6.67	14.93	2.33	5.22	65.00 <sup>c</sup> ± 3.88
Control	-	T10	55.33	10.67	19.28	12.33	22.29	15.63 <sup>d*</sup> ± 13.22

Same alphabets represent statistically at par group; \*Borer attack was increased in control treatment

# IMPACT OF SYSTEMIC INSECTICIDES

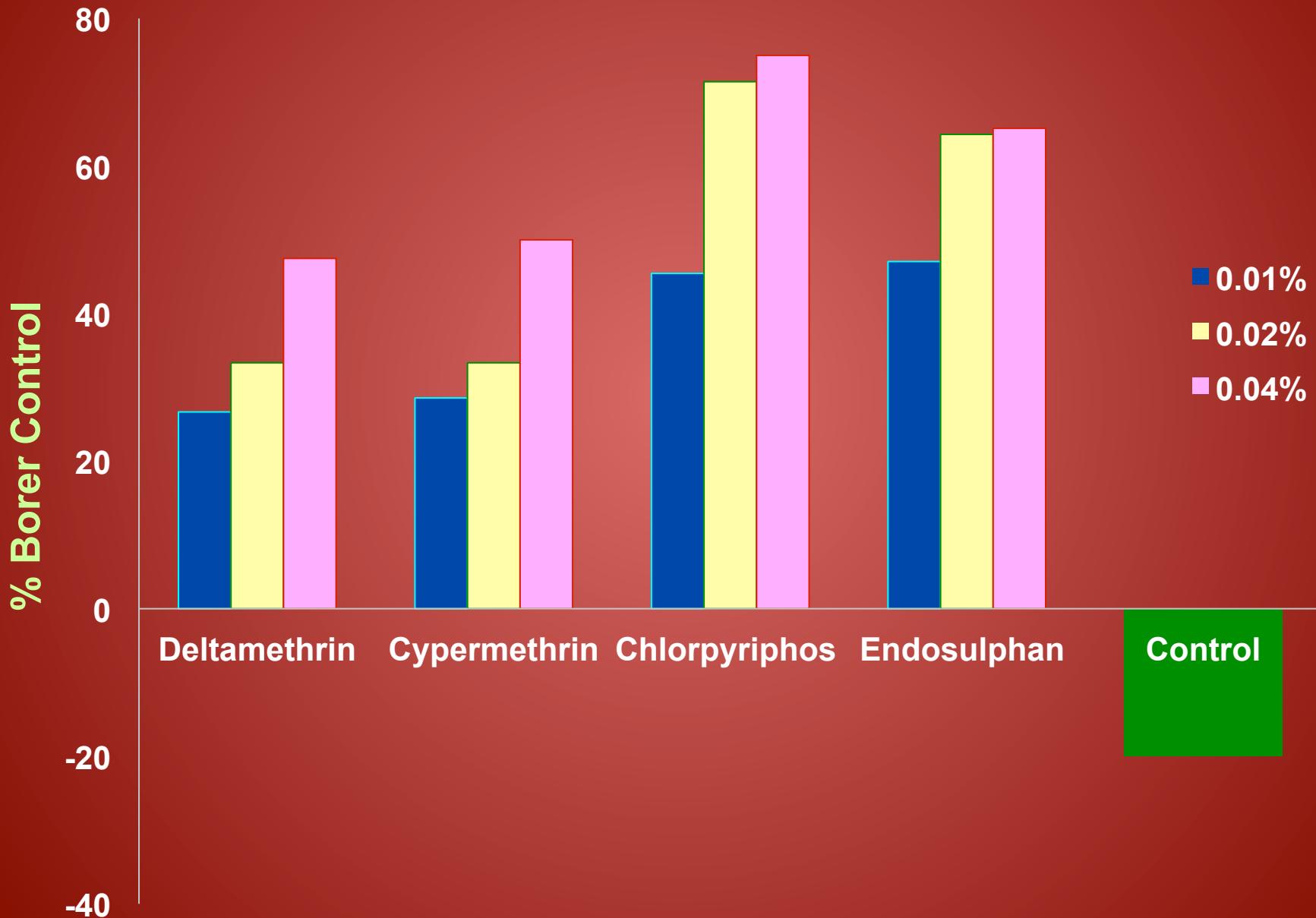


# CHEMICAL CONTROL : CONTACT INSECTICIDES

Insecticides	% of Dosages	Treatment	Mean No. of culms	Pre treatment observation (Mean)		Post treatment observation (Mean)		Average % borer Control
				No. of attacked culms	Initial % of attack	No. of attacked culms	Remained % of attack	
Deltamethrin 2.5 EC	0.01	T1	25.67	5.00	19.48	3.67	14.29	26.67 <sup>a</sup> ±4.81
	0.02	T2	28.00	6.00	21.43	4.00	14.29	33.33 <sup>a</sup> ± 7.51
	0.04	T3	26.00	5.67	21.79	3.00	11.54	47.48 <sup>a</sup> ± 9.62
Cypermethrin 25 EC	0.01	T4	25.00	4.67	18.67	3.33	13.33	28.57 <sup>a</sup> ± 7.69
	0.02	T5	23.00	4.00	17.39	2.67	11.59	33.33 <sup>a</sup> ± 0.03
	0.04	T6	24.67	4.67	18.92	2.33	9.46	50.00 <sup>a</sup> ± 11.56
Chlorpyriphos 50 EC	0.01	T7	24.33	3.67	15.07	2.00	8.22	45.45 <sup>a</sup> ± 17.65
	0.02	T8	31.67	4.67	14.74	1.33	4.21	71.43 <sup>b</sup> ± 3.86
	0.04	T9	24.33	4.00	16.44	1.00	4.11	75.00 <sup>b</sup> ± 2.75
Endosulphan 35 EC	0.01	T10	38.00	5.67	14.91	3.00	7.89	47.06 <sup>a</sup> ± 9.64
	0.02	T11	28.33	4.67	16.47	1.67	5.88	64.29 <sup>b</sup> ± 12.71
	0.04	T12	42.00	6.67	15.88	2.33	5.54	65.12 <sup>b</sup> ± 4.81
Control	-	T10	32.33	5.00	16.46	6.00	18.56	20.00 <sup>*c</sup> ±17.35

Same alphabets represent statistically at par group; \*Borer attack was increased in control treatment

# IMPACT OF CONTACT INSECTICIDES



# RESULTS

- Post treatment observations showed that the contact insecticides are performing better than systemic insecticides
- Chlorpyriphos (0.02 and 0.04%) provided significantly effective damage control of 71.43 and 75.00%, respectively
- Endosulphan (0.02 and 0.04%) yielded 64.29 and 65.12% damage control
- Imidacloprid (0.02 and 0.04%) effected 52.17 and 65.00% damage control
- Monocrotophos, Deltamethrin, Dimethoate and Cypermethrin were found comparatively less effective for the control of borer





# CONCLUSION

- *P. crassicornis* is a serious pest of green standing bamboo
- As many as 10 bamboo species were found to be attacked for the first time
- Larvae feed on woody tissues at nodes and internodes
- Maximum intensity of attack was found in *Bambusa wamin* (44.27%)
- Minimum intensity of attack was found on *Gigantochloa atroviolacea* (1.07 %)
- Contact insecticides performed better as compared to systemic insecticides
- Insecticides should be applied judiciously
- Chlorpyriphos (0.04 %) was found to be the most effective insecticide

# Thank you

Let plants and bamboos live forever !

# Forest Research Institute, Dehradun, India

