

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



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# 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**



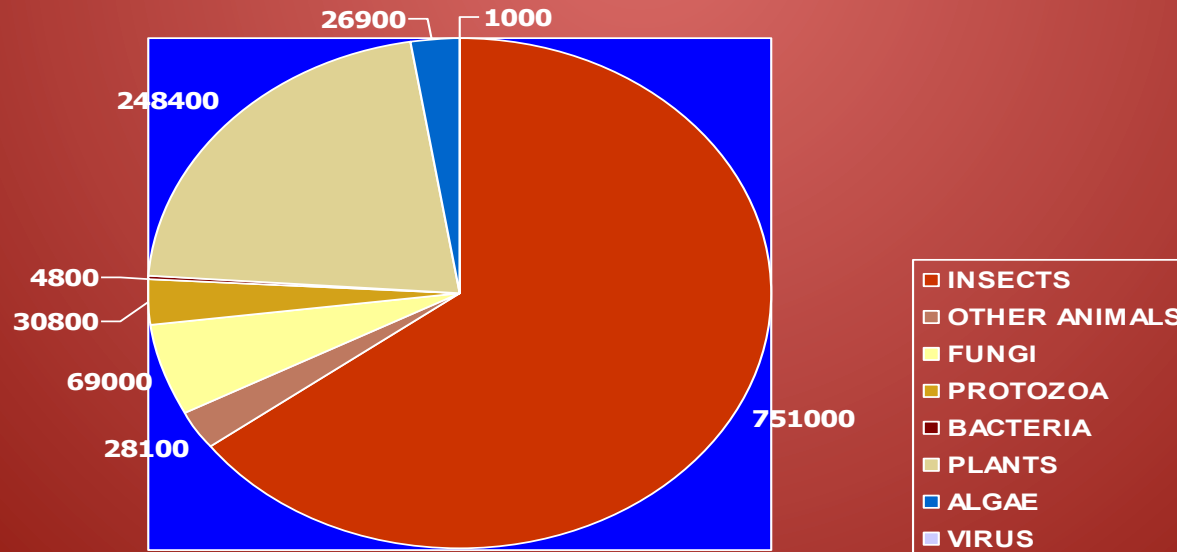
**Conc. vinegar used as insecticide**



# 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Eucalyptus	05.0	Stem borer and termites	0.0024 per ha	Forest Research Institute, India (Unpublished)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



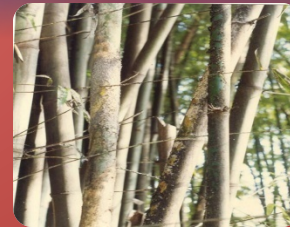
🚩 Defoliators - 48



🚩 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: Bostrychidae**

**Coleoptera: Lyctidae**

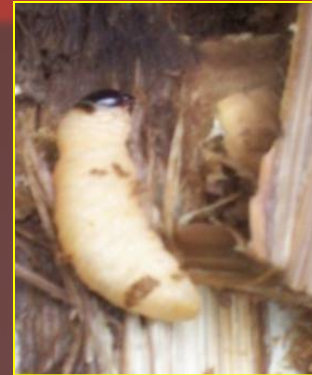
**Coleoptera: Cerambycidae**





# SHOOT AND CULM BORERS OF BAMBOOS

- ❖ *Cyrtotrachelus dux*  
(Coleoptera: Curculionidae)



- ❖ *Estigmena chinensis*  
(Coleoptera: Chrysomelidae)



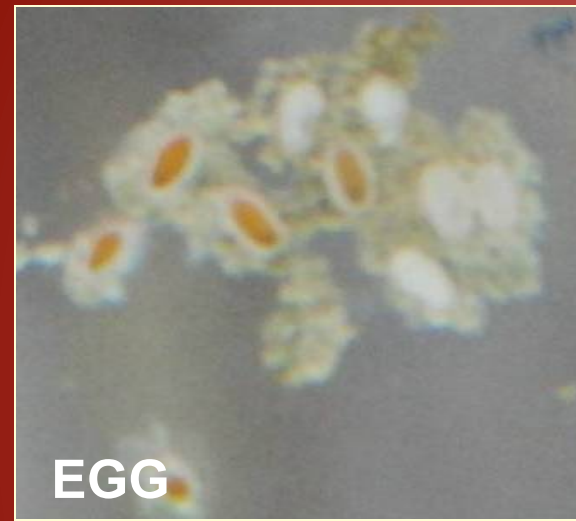
- ❖ *Phloeobius crassicollis*  
(Coleoptera: Anthribidae)





# **BAMBOO BORER**

***Phloeobius crassicollis***  
(Coleoptera- Anthribidae)



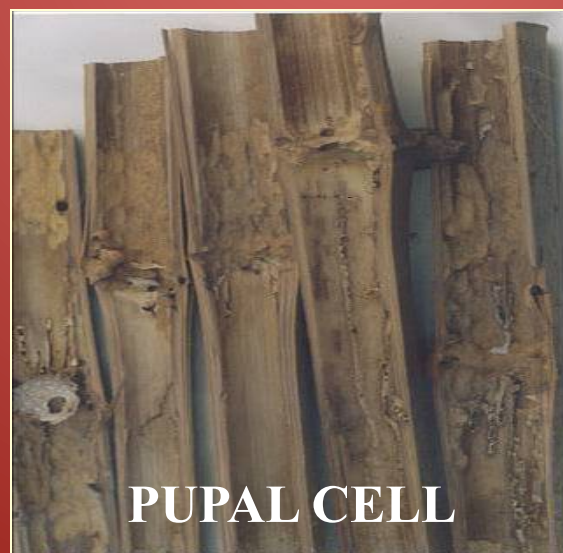
**EGG**



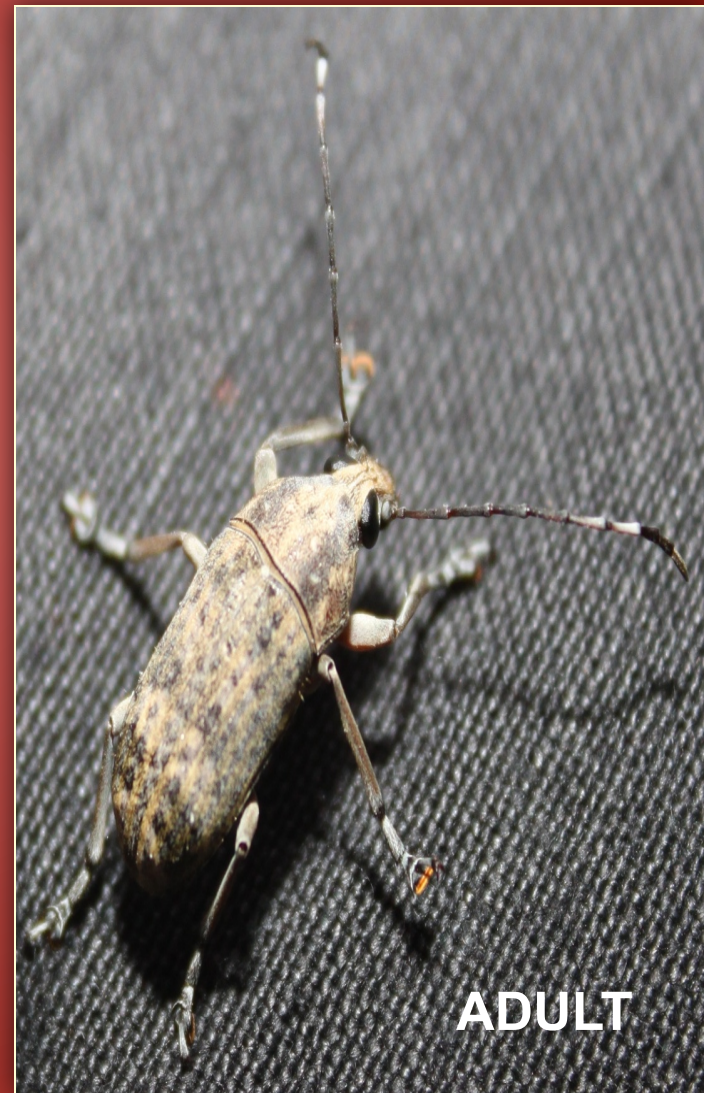
**LARVAE**



**PUPA**



**PUPAL CELL**



**ADULT**



# *Phloeobius crassicollis*

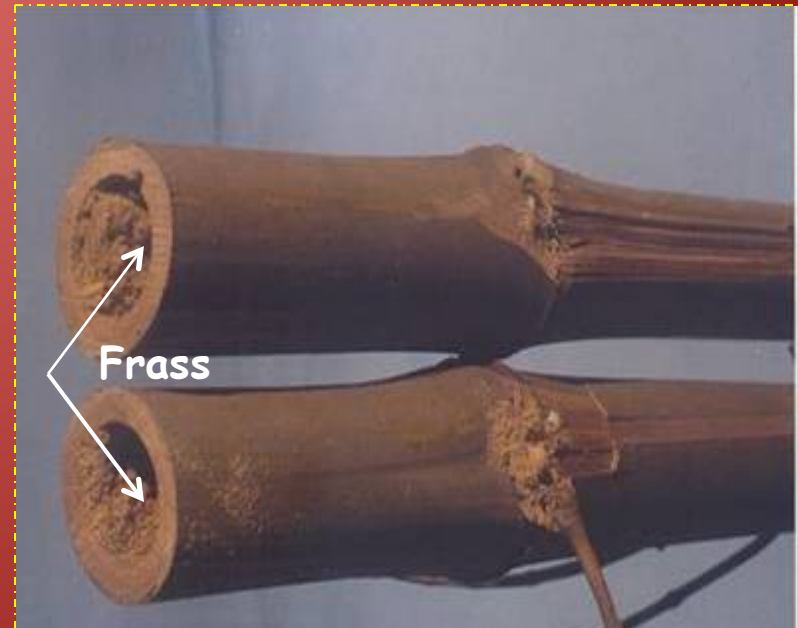
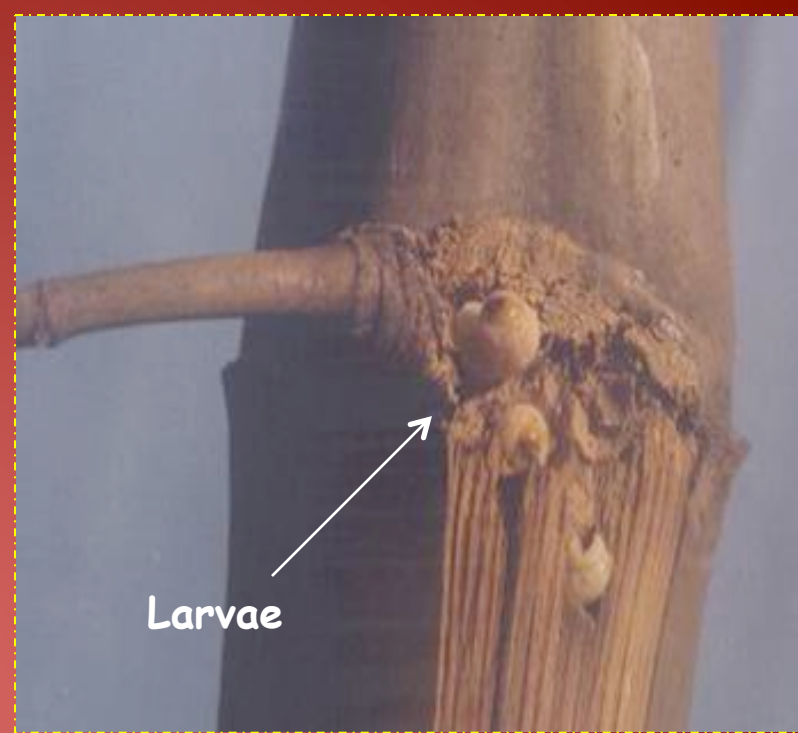
- ➔ Emergence of beetle in May-June
- ➔ Eggs laid at nodes/culm sheaths
- ➔ Larval period is more than 300 days



- ➔ 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

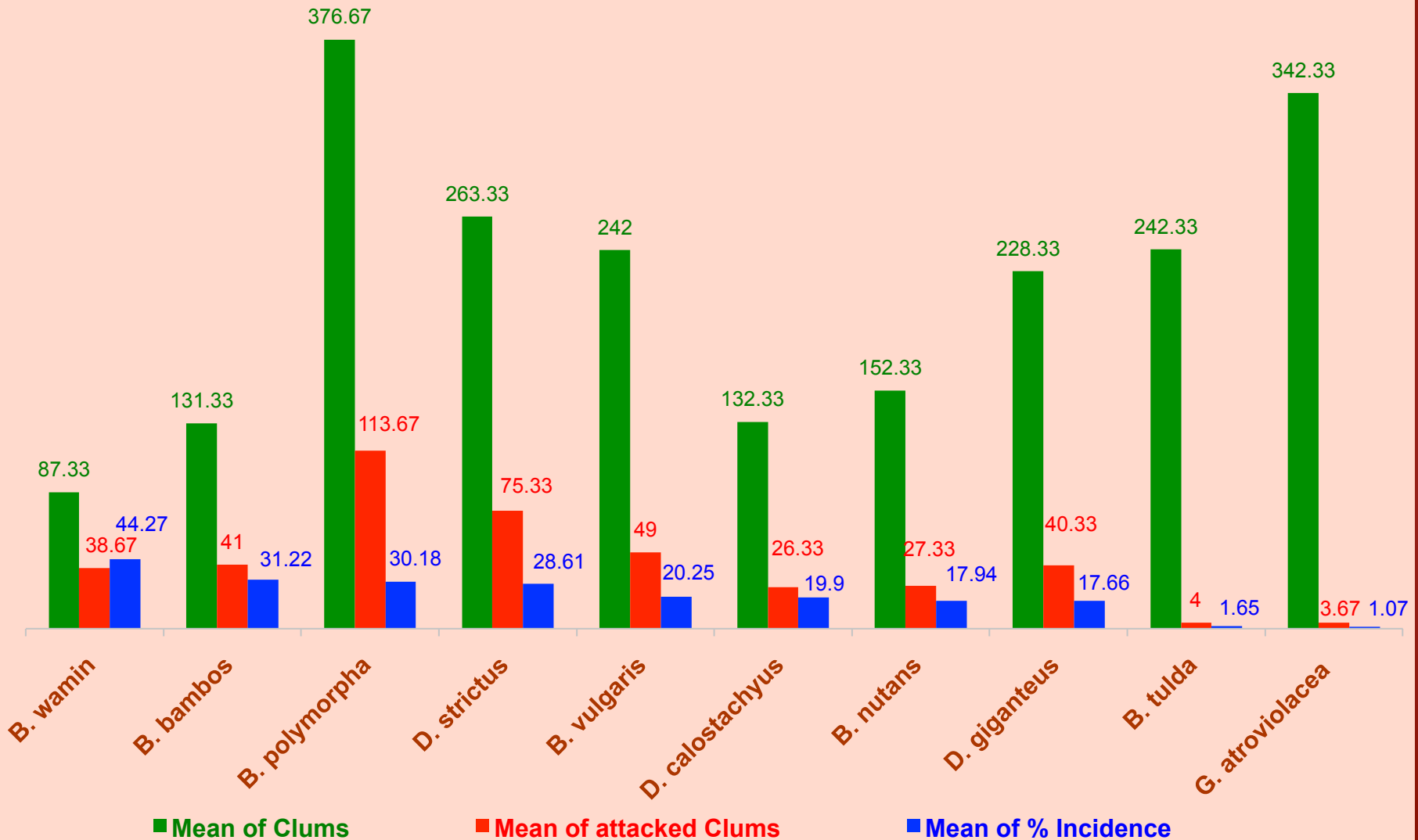


# INCIDENCE AND INTENSITY OF ATTACK

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 atrovioleacea</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 atrovioleacea*



# Chemical Control

## INSECTICIDES USED

- Contact insecticides (4)** : Cypermethrin, Deltamethrin, Endosulphan and Chlorpyrifos
- Systemic insecticides (3)** : Monocrotophos, Dimethoate and Imidachloprid
- Method used** : Internodal injection method
- Concentrations** : 0.01%, 0.02% and 0.04%

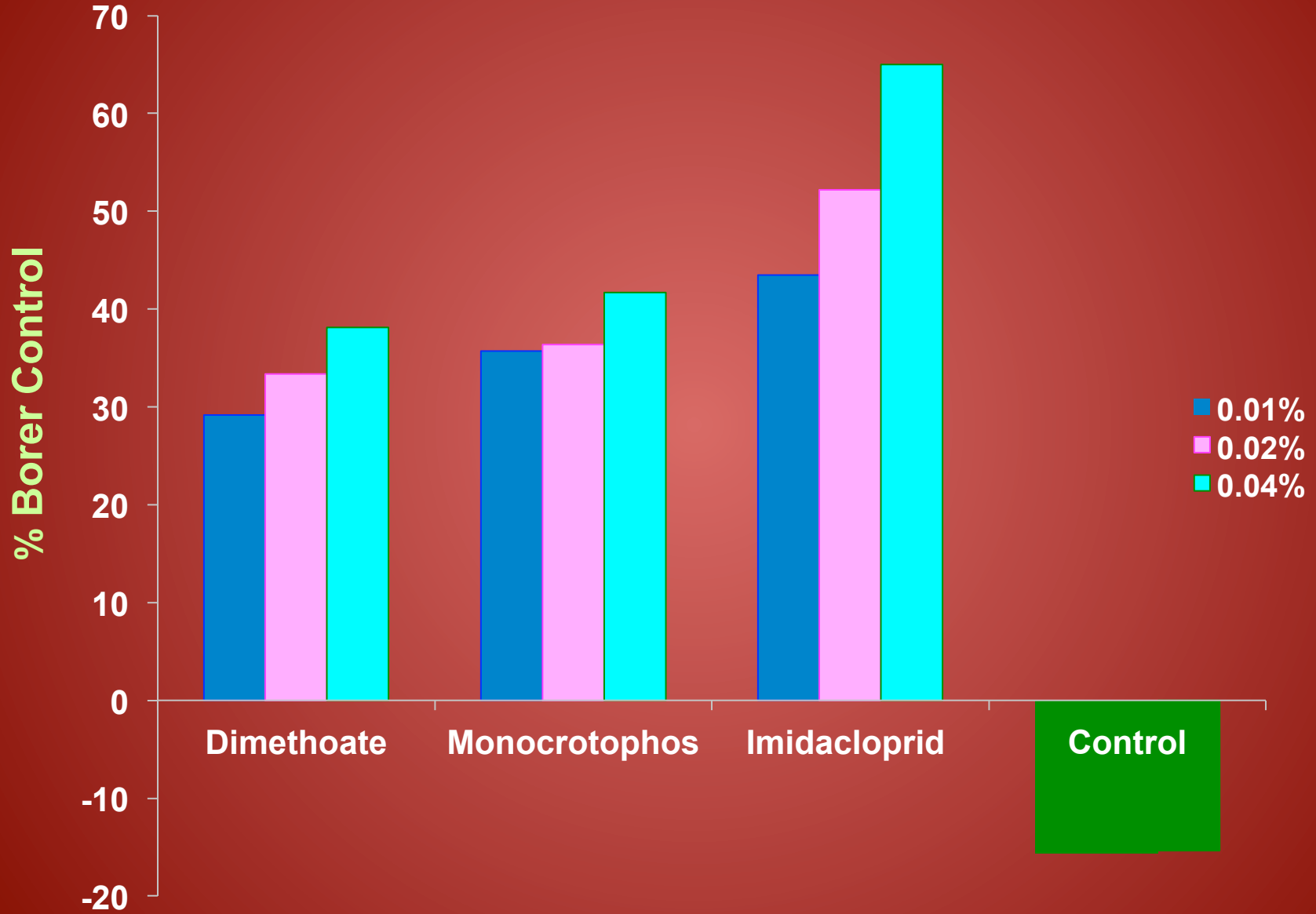


# CHEMICAL CONTROL : SYSTEMIC INSECTICIDES

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



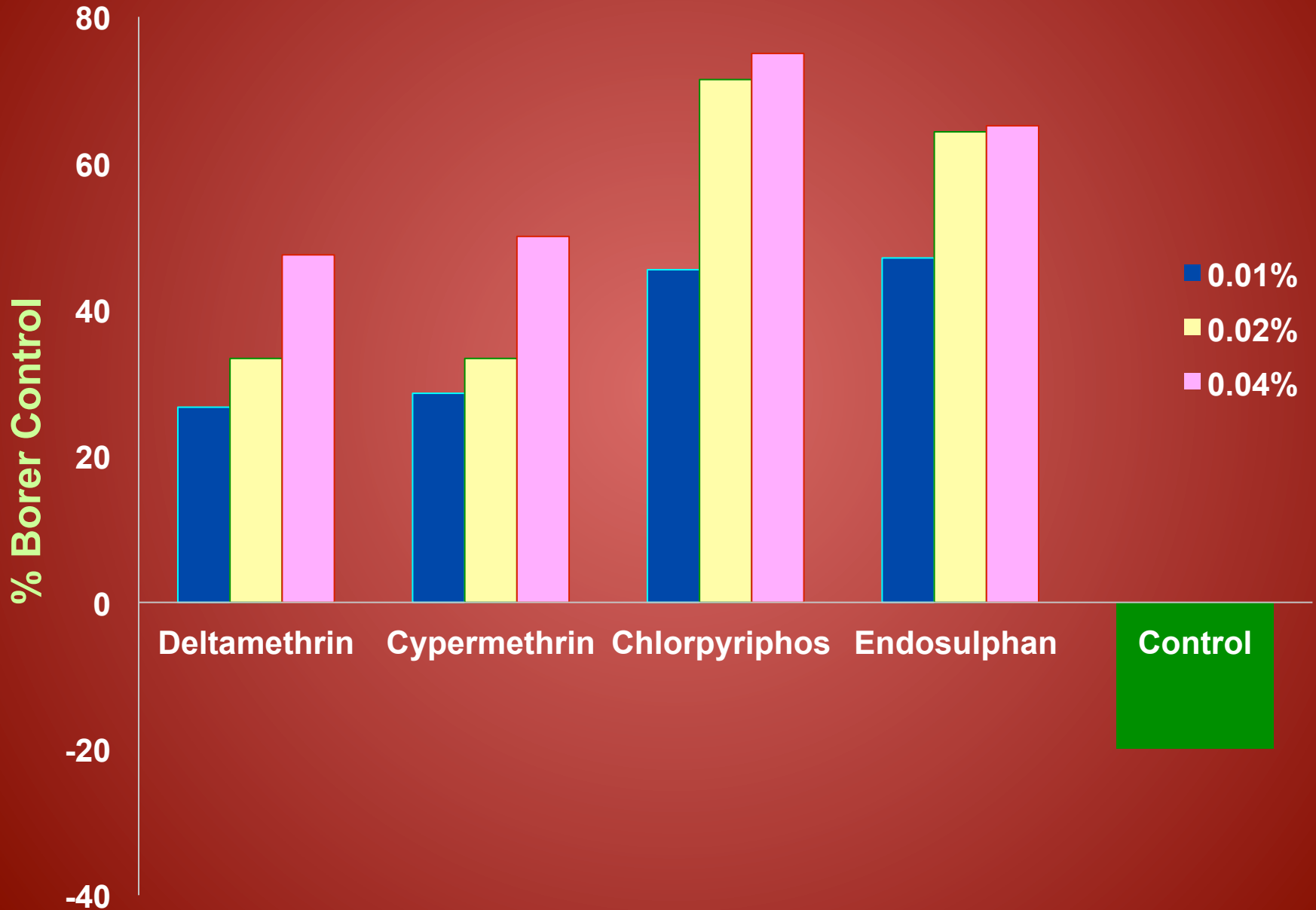


# CHEMICAL CONTROL : CONTACT INSECTICIDES

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
- Chlorpyrifos (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. crassicollis* 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 atrovioacea* (1.07 %)
- ✚ Contact insecticides performed better as compared to systemic insecticides
- ✚ Insecticides should be applied judiciously
- ✚ Chlorpyrifos (0.04 %) was found to be the most effective insecticide

**Thank you**

**Let plants and bamboos live forever !**



# Forest Research Institute, Dehradun, India

