

# **Bamboo Witches' Broom Disease in the Philippines, Its Spread and What We Need To Do**

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# Background – how it started



## Is Witch's Broom Sweeping Philippine Bamboos?

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stands along the highway in the towns of Cavinti and Luisiana in Laguna and some parts of Pagbilao and Lucban in Quezon (Sinohin, 1995).

Symptomatology and reports from India, China and Bangladesh (Mookerjee, 1960) almost velvety and 17.5 to 39 cm long become smooth or glabrous and 3 to 12 cm, 6 to 27 cm shorter, when diseased. The bamboo branches also thicken and form into a rosette or bouquet.

As all the tertiary branches become involved in rosette formation, the culms sometimes become too heavy, unable to withstand the rosettes. The culms eventually droop, usually crack at points and fall to the ground.

### Disease Incidence in RP

The authors' preliminary ocular survey of some 20 Philippine provinces validates their earlier fears that the incidence of witch's broom in the Philippines warrants hanging.

In the T'boli and Lake Sebu areas of South Cotabato, *Dendrocalamus asper* and *G. atter* stands were found to be seriously infected with the disease. Most of both young and old clumps were observed to have early and advanced rosettes.

As reported by Dransfield and Widjaja (1995), other species attacked by this

January - February 1999

Caasi-Lit et al 1999

Several projects on:

Survey of arthropods associated with bamboo;  
Arthropod pests of bamboo: taxonomy, biology,  
natural enemies and host plant resistance

Bamboo shoots as vegetable substitute during La Nina

WE ALREADY OBSERVED WITCHES BROOM DISEASE  
INFECTED BAMBOOS in the 1990's

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## TAXONOMIC SURVEY AND BIOLOGICAL OBSERVATIONS OF INSECTS ASSOCIATED WITH BAMBOO SHOOTS IN THE PHILIPPINES

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This is the first comprehensive report on insect pests associated with bamboo shoots in the Philippines. Twenty-two insects were observed to be associated with the basal shoots (*labong*) of several bamboo species in plantations and natural stands. They were collected from the field, further observed in the laboratory and identified. Of the 22, nine species are herbivorous. The primary insect pests include at least three species of bamboo aphids [*Pseudoregma alexanderi* (Takahashi), *Ps. bambusicola* (Takahashi) and *Ps. sp. nr. pseudomontana* (Takahashi)], the bamboo shoot mealybug [*Palmicultor lumpurensis* (Takahashi)], the bamboo

# Background

- Bamboo witches' broom disease (BWBD) was first recorded Laguna Province in 1995 (Sinohin 1995)
- popularly known before as mycoplasma like organism (MLO).
- Survey in 1999 (Caasi-Lit et al) affected only two bamboo genera
- high Incidence where the species are abundantly growing.
- For example, *Gigantochloa levis* is abundant in Laguna/Quezon (Luzon)  
*Dendrocalamus asper* in South Cotabato and Bukidnon (Mindanao)
- After 20 years and more, 6 genera
- molecular characterization identified the pathogen as *Candidatus Phytoplasma luffae* - related strain 16SrVIII (Dolores et al. 2023) on *Dendrocalamus merrillianus*

# Objectives

- This paper documents the historical background and consolidates geographical information of BWBD from 1995 up to the present.
  - This includes observations on its current local distribution and sightings of symptomatic bamboo samples that are not included in our latest paper (Dolores et al 2023).
  - additional information will be valuable in studying the extent of infection or spread in the different bamboo species and location
  - useful in formulating management options for control.
  - to call the attention of concern government agencies and convey this important message that
- “supply of quality bamboo may be affected in the future if BWBD is left unchecked”**

**NORMAL COMPOUND LEAF**

# Symptoms of bamboo witches' broom disease - excessive clustering of branches and leaves

Orchid-like, Bouquets, Mistletoe, Flowers

**EXCESSIVE BRANCHLETS/LEAFLETS**

**WITCHES' BROOM INFECTED LEAVES**

G. Levis (Majayjay Laguna)





Affected culms will bend and then break due to the heavy weight of infected branches



*D. asper* – Impasug-ong Bukidnon

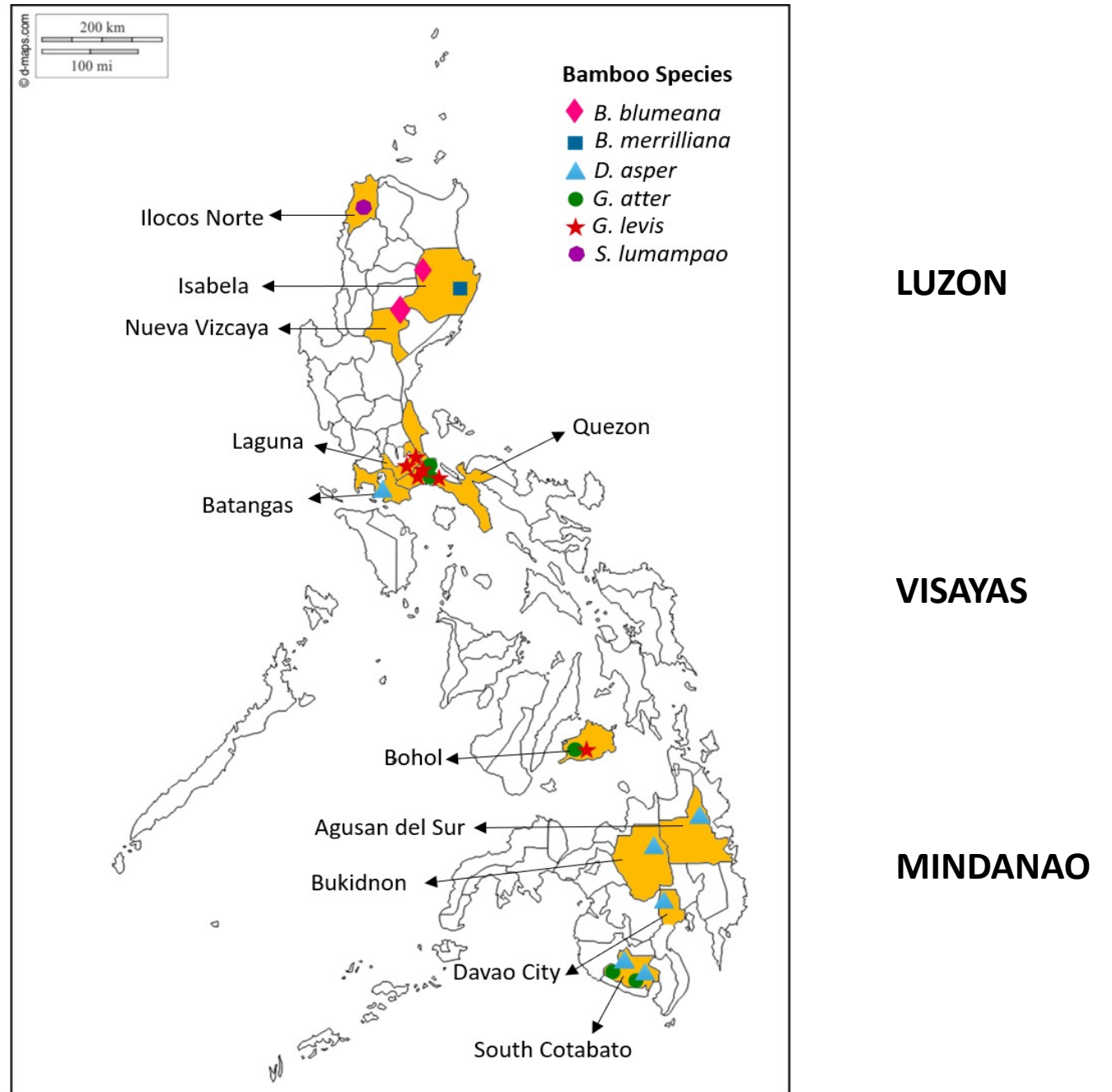
Symptoms are also observed at the base of the culm

*D. asper* - Agusan del Sur

# Distribution of bamboo species with signs and symptoms of witches' broom disease in the Philippines

1999 Survey:

11 provinces



Based on the signs and symptoms, two bamboo genera affected by BWBD  
**Dendrocalamus**  
**Gigantochloa**

*Latest survey:*  
*Increased to*  
**20+ provinces in 2024**

BWBD was observed in 2018-2019 in  
*Dendrocalamus merrillianus*  
 (= *Bambusa merrilliana*)  
 and  
*Bambusa spinosa*.

Plant species	Common/Localname	Location	Year observed	Reference
<b>Gigantochloa levis (Blanco) Merrill</b>	Bolo	Cavinti, Laguna	1995	Sinohin (1995)
			1999	Caasi-Lit et al. (1999)
		Luisiana, Laguna	1995	Sinohin (1995)
			1999	Caasi-Lit et al. (1999)
		Pagbilao, Quezon	1995	Sinohin (1995)
			1999	Caasi-Lit et al. (1999)
		Tayabas, Quezon	1999	Caasi-Lit et al. (1999)
<b>Gigantochloa atter (Hassk.) Kurz</b>	Kayali	Lucban, Quezon	1999	Caasi-Lit et al. (1999)
		T'Boli, South Cotabato	1999	Caasi-Lit et al. (1999)
		Lake Sebu, South Cotabato	1999	Caasi-Lit et al. (1999)
			2018	This paper
		Sikatuna, Bohol	2018	This paper
<b>Dendrocalamus asper (Schult. &amp; Schult. F.) Backer</b>	Giant bamboo	Cuenca, Batangas	1999	Caasi-Lit et al. (1999)
		Malaybalay, Bukidnon	1999	Caasi-Lit et al. (1999)
		T'Boli, South Cotabato	1999	Caasi-Lit et al. (1999)
		Agusan del Sur	1999	Lit et al. (1999)
		Lake Sebu, South Cotabato	1999	Lit et al. (1999)
		Marilog, Davao City	2019	This paper
<b>Schizostachyum lumampao (Blanco) Merr</b>	Buho	Ilocos Norte	1999	Caasi-Lit et al. (1999)
<b>Dendrocalamus merrillianus (Elmer) Elmer</b>	Bayog	Gamu, Isabela	2019	This paper
		Tarlac	2019	
<b>Bambusa spinosa Roxb.</b>	Kawayan-tinik	Roxas, Isabela	2019	This paper
		Bagabag, Nueva Vizcaya	2019	This paper



# HOW LONG ARE THE AFFECTED BRANCHES?



*Gigantochloa levis* –Bohol; Laguna



*Dendrocalamus asper* – Carmen North Cotabato; Santiago, Agusan del Norte

*Gigantochloa atter*



Kabadbaran, Agusan Norte 2023



Lake Sebu, South Cotabato 1999, 2023



San Francisco Agusan Sur 2023

*Gigantochloa atter*



Majayjay, Laguna



Cabadbaran, Surigao Sur



Alegria Surigao Norte

# 2018 Kawayang Bayog – *Dendrocalamus merrillanus*



Isabela 2018



Tarlac 2020

# 2019 Spiny bamboo- *Bambusa spinosa*



Bagabag, Nueva Viscaya 2019



Iguig, Cagayan 2019



Roxas, Isabela 2019

# 2019 Monastery bamboo – *Thyrsustachys siamensis*



Insects collected from affected parts of the witches' broom disease bamboo in the Philippines (updated, Lit and Caasi-Lit 1999)

Prevalent in the past 10 years:  
Node mealybug  
Culm mealybug

Common vectors of BWBD  
Planthoppers  
Leafhoppers

ORDER/FAMILY	COMMON NAME	SCIENTIFIC NAME	SURVEY	
			1999	2023
HEMIPTERA Suborder Sternorrhyncha Pseudococcidae	Bamboo node mealybug Bamboo culm mealybug	Antonina thaiensis Takahashi Chaetococcus bambusae (Mask.)	✓	✓
	Bamboo leaf mealybug	Paracoccus interceptus Lit	✓	✓
	Bamboo leaf mealybug	Trionymus sp.		✓
	Bamboo leaf mealybug	Exilipedronia(?) sp.		✓
Asterolecaniidae	Common bamboo pit scale	Bambusaspis bambusae (Boisd.)	✓	✓
	Bamboo pit scales	Bambusaspis spp.	✓	✓
	Black bamboo pit scale	Bambusaspis sp. (black)		✓
Diaspididae	Armored scales	Odonaspis spp.	✓	✓
Aphididae	Bamboo leaf aphids 'T-shirt'	Astegopteryx insularis (v.d.Goot)	✓	✓
	Bamboo leaf aphids	Astegopteryx spp	✓	✓
	Bamboo leaf aphids	Cerataphis sp.		✓
	Bamboo shoot aphids	Pseudoregma spp.	✓	✓
Suborder Auchenorrhyncha	Bamboo leafhopper	Cofana sp.	✓	✓
Cicadellidae	Typhlocybinae leafhopper	Typhlocybinae (undetermined)	✓	✓
Fulgoridae	Bamboo planthopper	Purohita cervina Distant	✓	✓
HYMENOPTERA Formicidae	Crazy ant	Anoplolepis gracilipes (Jerdon)	✓	✓
	Common black ant	Dolichoderus thoracicus Mayr	✓	✓
	Green tree ant	Oecophylla smaragdina (Fabr.)	✓	✓
	Red fire ant	Solenopsis geminata (Fabricius)	✓	✓
COLEOPTERA Coccinellidae	Small black lady beetle	Scymnus sp.		✓
Chrysomelidae	Hispine beetle	Callispa sp.		✓
THYSANOPTERA Thripidae	green/black thrips	Undetermined species	✓	

Insects collected from fresh witches' broom disease branches on *G. levis*.  
ants attending to black pit scale insect, a species of *Bambusaspis* sp



NODE MEALYBUG, *Antonina* sp.



LACK OF WORK ON INSECT VECTORS OF



STARTED ONLY WITH ONE OR TWO CULMS IN 1990's

After 27+ years...

ALMOST ALL CULMS IN A CLUMP ARE INFECTED



LAKE SEBU, SOUTH COTABATO- 1990's



Giant bamboo - *Dendrocalamus asper*



LAKE SEBU, SOUTH COTABATO- 2024

# Recommendations

1. National Program on quarantine measures to mitigate the spread of BWBD.
2. Precautionary measures must be in place as phytoplasma is systemic in nature and can be transmitted using infected seeds and propagules.
3. Search for healthy clumps of *D. asper* and *G. levis* as sources of healthy planting materials/propagules or intensify tissue culture
4. Continue survey and collection (with permits) of BWBD disease around the country
5. Basic studies on potential vectors among locally occurring insects and other arthropods along with transmission studies
6. Increase BWBD Awareness through IEC materials, lectures, exhibits and other means.
7. Rapid detection kit should be developed which is very useful in the field.
8. Molecular analysis through PCR or LAMP of the collected infected specimens

Even if it takes to have all the culms in the clump infected for at least 27+ years (data for giant bamboo in southern Philippines), we need to continue this research on BWBD.

Let us gather and put our minds and hands together, Join us.....



**THANK YOU**

**XIE XIE**