Structural dynamics of *Dendrocalamus copelandii* (Poaceae: Bambusoideae) Community after dieback

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Abstract

The bamboo species *Dendrocalamus copelandii* (Gamble ex Brandis) N.H. Xia & Stapleton is among the largest bamboos found in Thailand. It was reported to be the new species recorded for the country in 2007. This bamboo is confined to the mixed deciduous forests on limestone ranges at altitudes from 150 m to at least 500 m along the western part of Thailand from Mae Hong Son, Tak to Kanchanaburi. In the late of 2009, all populations in Mae Hong Son were found gregariously flowering. A mixed deciduous forest dominated by *D. copelandii* on limestone range in Pang Ma Pa district of Mae Hon Son province was chosen to study. Comparison of some aspects of structural dynamics of the community between 2010 and 2012 are shown here.

Introduction

Mixed deciduous forest is one of the main forest types in Thailand which composed of many ecologically and economically important deciduous tree species. However, it has many variations in composition and structure (Bunyavejchewin 1983, 1985). Several bamboo species can be found dominantly in the middle layer in this type of forest. *Bambusa tulda*, *Cephalostachyum pergracile*, and *Gigantochloa albociliata* are the most common among them (Kutintara 1994, Marod et al. 1999). These bamboos are, however, small to medium. Study on, particularly on ecological aspects, the large size bamboo such as *Dendrocalamus copelandii* in mixed deciduous forest, on limestone range in particular (Sungkaew et al. 2007), has never been investigated.

Study site and Methods

This study was conducted in a mixed deciduous forest dominated by *D. copelandii* on limestone range (MDF) in Pang Ma Pa district of Mae Hon Son province. A permanent plot of 1 hectare was laid in late 2010 when the seedlings of *D. copelandii* had already germinated. The main plot was divided into 100 subplots of 10x10 m^2. All trees, in 10x10 m^2 subplots, with the diameter at breast height (1.30 m, DBH.) from 4.5 cm upward were tagged, measured, and identified. Tree saplings (having DBH. smaller than 4.5 cm but the height greater than 1.30 m), in the subplots of 4x4 m^2 which were systematically laid within all the 10x10 m^2 subplots, were tagged and identified. Tree seedlings (having the height smaller than 1.30 m), in the subplots of 1x1 m^2 which were systematically laid within all the 4x4 m^2 subplots, were also tagged and identified. In the 4x4 m^2 subplots, seedlings of *D. copelandii* were tagged.

Results and Discussion

Tree density and basal area (years 2010:2012) of MDF were 390 ha^{-1}:446 and 17.23:19.09 $m^2.ha^{-1}$, respectively. 63:69 tree species (years 2010:2012) were found and the first five dominant species were the same between two years, namely *Xylia xylocarpa* var. *kerrii*, *Garuga pinnata*, *Anogeissus acuminata*, *Ficus* cf. *lacor*, and *Diospyros castanea* (see Table 1). These results are similar, in some degree, to the structure of mixed deciduous forest on the soil parent material of the Rachaburi and the Kanchanaburi series at the 4-hectare permanent plot at Mae Klong Watershed Research Station, Thong Pha Phoom district, Kanchanaburi province where they are 170.5 ha^{-1} and 17.25 $m^2.ha^{-1}$ (Marod et al. 1999). And the first five tree species composition (from the total of 93 species) of the 4-hectare permanent plot were were *Shorea siamensis*, *Dillenia parviflora* var. *kerrii*, *Xylia xylocarpa* var. *kerrii*, *Vitex peduncularis*, and *Mangifera caloneura*. This would suggest that the size of the trees in MDF_l are relatively smaller than that of the ones at Kanchanaburi province. The survival rates of the bamboo seedling were 60.42% in 2010 and 44.53% in 2012.

Table 1 Tree density and basal area of the MDF_1 and its first ten tree species composition

Species	YEAR 2010						YEAR 2012					
	Density (tree/ha)	Basal Area ($m^2.ha^{-1}$)	RD (%)	RF (%)	Rdo (%)	IVI (%)	Density (tree/ha)	Basal Area ($m^2.ha^{-1}$)	RD (%)	RF (%)	Rdo (%)	IVI (%)
Xylia xylocarpa	50	3.37	12.82	11.08	19.56	43.46	52	3.77	11.66	10.32	19.75	41.73
Garuga pinnata	20	2.94	5.13	5.06	17.05	27.24	20	3.34	4.48	4.58	17.49	26.56
Anogeissus acuminata	27	1.31	6.92	6.96	7.59	21.48	28	1.45	6.28	6.59	7.60	20.47
Ficus cf. *lacor*	24	0.93	6.15	5.70	5.43	17.28	26	1.17	5.83	5.73	6.12	17.68
Diospyros castanea	18	0.75	4.62	5.06	4.34	14.02	18	0.87	4.04	4.87	4.55	13.45
Polyalthia cerasoides	21	0.27	5.38	4.75	1.59	11.72	**21**	**0.33**	**4.71**	**4.30**	**1.72**	**10.73**
Sterculia macrophylla	17	0.22	4.36	5.06	1.30	10.73	**22**	**0.29**	**4.93**	**5.16**	**1.49**	**11.58**
Diospyros variegata	14	0.50	3.59	4.11	2.88	10.58	17	0.56	3.81	3.72	2.94	10.48
Mallotus philippensis	15	0.21	3.85	3.80	1.24	8.89	18	0.27	4.04	4.01	1.40	9.45
Dimocarpus longan	13	0.36	3.33	3.48	2.06	8.88	12	0.44	2.69	2.87	2.33	7.88
Other 53:59 species	171	6.37	43.85	44.94	36.96	125.74	212	6.60	47.53	47.85	34.60	129.99
Total: 75 species	**390**	**17.23**	**100**	**100**	**100**	**300**	**446**	**19.09**	**100**	**100**	**100**	**300**

Remarks; RD = Relative Density; RF = Relative Frequency; Rdo = Relative dominance); IVI = Importance Value Index (=RD+RF+Rdo)

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