

学位論文全文に代わる要約 Dissertation Abstract

氏名 :
Name Atus Syahbudin

学位論文題目 :
Title of Dissertation
Distribution, Planting Pattern and Social Value of *Casuarina equisetifolia* Plantation in the Southern Coast of Yogyakarta, Indonesia
(インドネシア、ジョグジャカルタ南海岸における *Casuarina equisetifolia* 人工林の分布、植栽様式および社会的価値)

学位論文要約 :
Dissertation Abstract

Until now numerous examples of past and ongoing forest rehabilitation exist in Indonesia. This dissertation presents a previous coastal condition in the southern coast of Yogyakarta based on coastal inhabitant's perception and its currently changing. Strong wind, hot weather and limited shade trees or green landscapes constitute previous main problems in the beaches, agricultural lands, roads, and villages nearby coast.

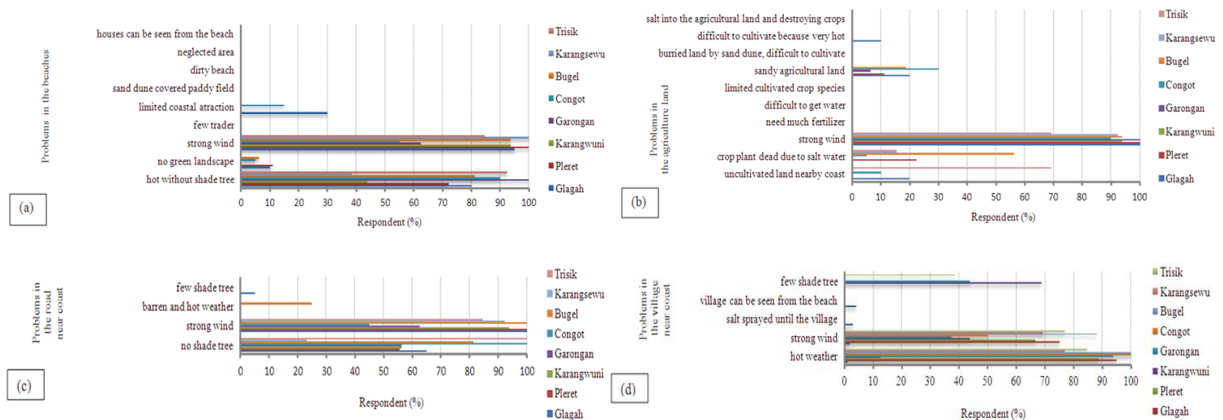


Fig. The previous condition before establishment of *C. equisetifolia* in the southern coast of Kulon Progo Regency in:

(a) beaches; (b) coastal agricultural lands; (c) roads; (d) coastal villages.

These conditions have later been changing after the establishment of introduced tree species, especially beach sheoak (*Casuarina equisetifolia*). *C. equisetifolia*, which its seeds were collected from Lombang Beach, Province of East Java, was introduced into Samas Beach, Regency of Bantul, Special Province of Yogyakarta in October 1996.

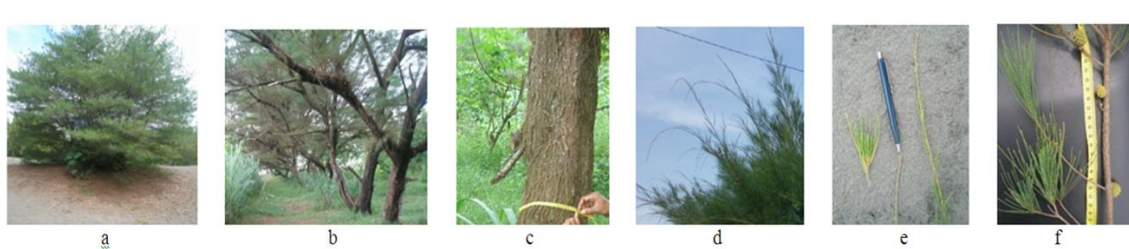


Fig. Morphology of *C. equisetifolia*: a. crown; b. stem; c. bark; d. foliage, like shrimp tails; e. branchlets; f. branch with cones.

Based on the examination of herbarium specimens from herbaria of Bogoriense, the distribution of *C. equisetifolia* in Indonesia are as follows:

Casuarina equisetifolia : Sumatera, Kalimantan, Sulawesi, Moluccas, Java, Lesser Sunda Islands. The location of specimens were Lampung, *Verlaten/Ferlaten* Island (Sertung Island), Krakatau groups, 1906 (64052); North Sumatera, Serdang near Tjermin beach, 1928; Tapakuda Island in delta of Wampu and Batang Serangan river, 1934; Sibolangit Bali Garden; Siberut Island, North Siberut, Timiti district, Sikabalu, 1994 (BO 1866448); West Kalimantan, Sukadana, Sukadana village, 1953 (BO 1652722); East Kalimantan, Tarakan, Tidung, Amal village, 1953 (BO 1652719); Nunukan, Sebatik, Badjau river (BO 1398812); Flores, Manggarai, 197?; Flores, Manggarai, Cebe village, Batucie, 1988 (BO 1866458); Lombok, Mt. Rinjani, 1964; Lombok, Mt. Rinjani, 2003 (BO 1519039); Lombok, Mt. Rinjani, 2003 (1838767); Sultanat Bima, 1909 (BO 1652758); Sumbawa (BO 1652758); Sumba, Winkelo, 1932 (BO 1410332); Moluccas, Wetar, 1909 (BO 1652757), Selaru Island, Tanimbar Islands.

Casuarina equisetifolia subsp. *Equisetifolia* : Java, Batavia, Tanjung Priok, *Culta*, 1902, 1903, 1904; Cilincing, 1904, 1928; Pajoeng Island, 1906; Paniki Island, 1906; Bokor Island, 1920; 1922 (63894); West Java, Batu Tulis, 1894; Bogor, *Culta*, 1928 (BO 1410331); Central Java, Tegal, 1917 (BO 1398741); East Java, Madura Island, Bangil (?), 1913 (BO 1398742); Madura Island, Sapulu, 1915 (BO 1400332); Madura Island, *N.O. van Batang*, Batang Daja, *Duincamp/en/duinen*; Kediri, Gadoengan, 1922 (63892); Java ? , 1951 (63930); South Sulawesi, Selayar Island, 1904; Kalao Island; Panaitan Island, Legon Mandar/North Peninsula, West of Tg. Paraf, 1951 (BO 1652762); Flores, Ende, 1927; Flores, Ende, 1941 (BO 1660549), Ende, 1941; Manggarai, Lili Beach, 1972; Sumba, Waikalo, 1925 (1398811); Wurhelo (?), 1932 (BO 1660544); Ambon, Pombo Island, 1984; West Seram, Lobbi village, 1928 (BO 1660553); West Seram, Wae Selan, 1938.

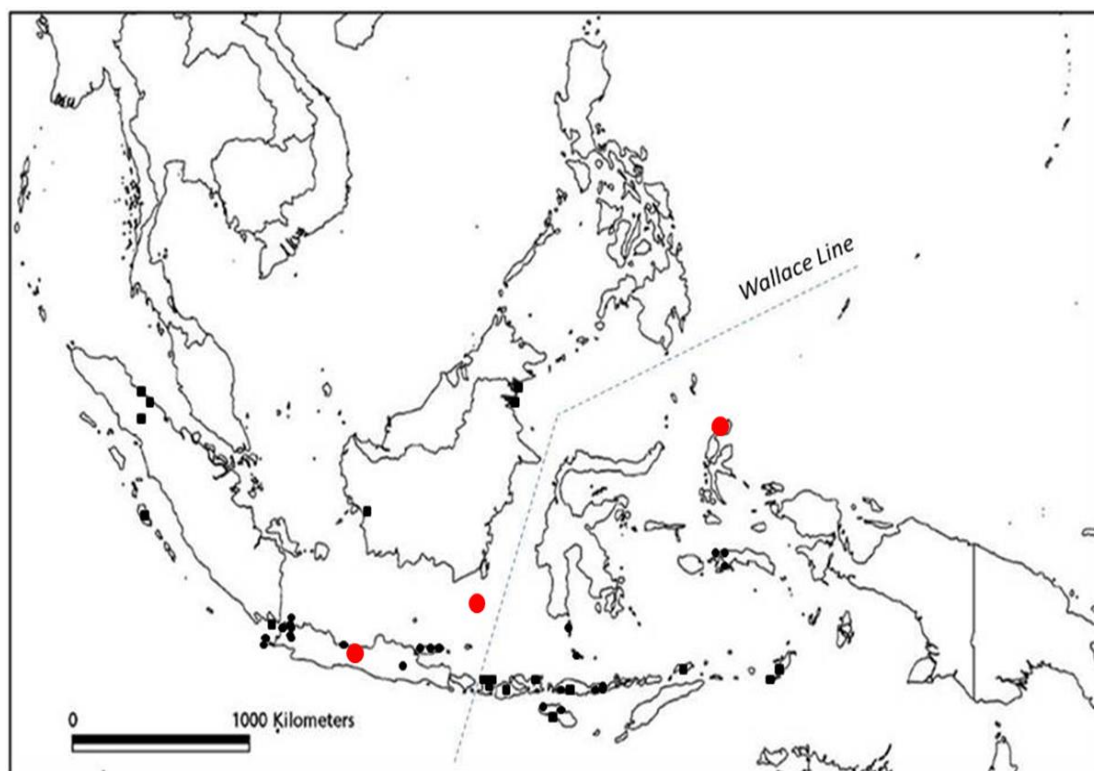


Fig. The distribution of *C. equisetifolia* (■) and *C. equisetifolia* subsp. *equisetifolia* (●) in Indonesia based on the examination of herbarium specimens from the National Herbarium Bogoriense (BO) in 2010. Whereas (●) constitutes distribution of *C. equisetifolia* according to forestry compendium CABI.

(様式 5) (Style5)

During the last decade (1996-2012), this species has spread well with aid of people into Parangtritis sand dune and 27 beaches in 21 coastal villages in the southern coast of Yogyakarta (65.5%). There were five planting patterns applied i.e. oblique comb, *untu walang*, row formation, rectangle, and in individual. The first two that was the early trial plantation pattern are not currently replicated by coastal inhabitant. Whereas the rest has nowadays been successfully providing environmental services i.e. functioning as windbreaks, shading, beautifying and greening coastal landscapes, reducing a dried coconut leaf usages, and providing other benefits.



Fig. Planting pattern of *C. equisetifolia* by using Google Earth reference images: A. oblique comb; B. *untu walang* (left) and rectangle (right); C. rows formation; D. individual.

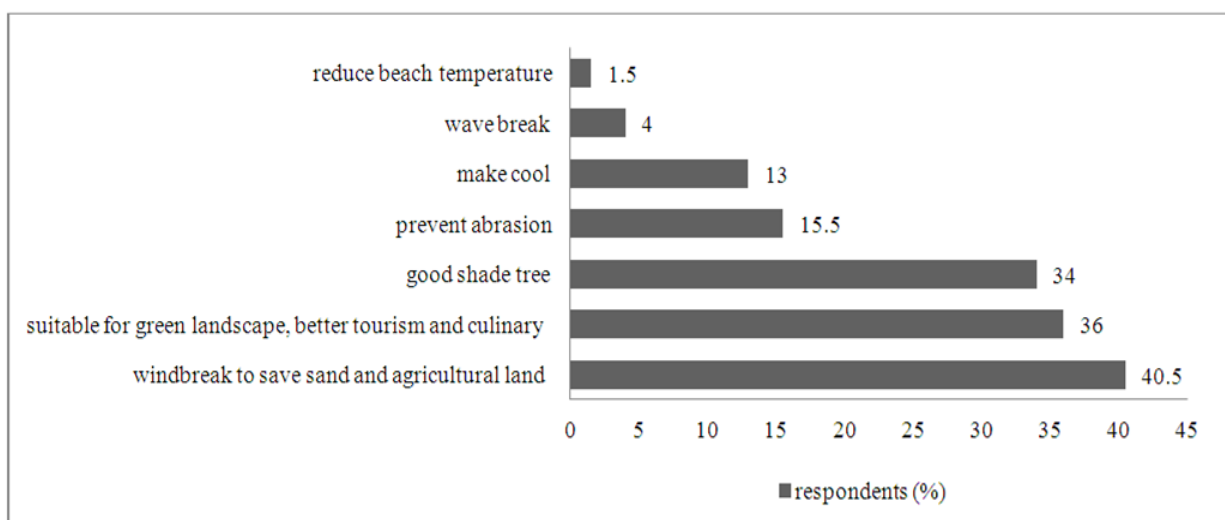


Fig. The use of *C. equisetifolia* by coastal inhabitant along the Southern Coast of Bantul Regency

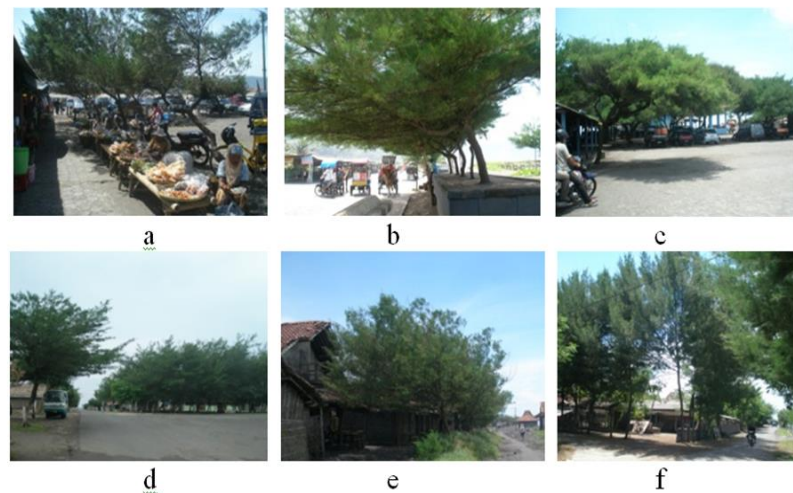


Fig. The use of *C. equisetifolia* in individuals as shady tree

Presence of benefits of *C. equisetifolia* caused close relationship between coastal inhabitants and this species. Their relationship was also reflected within food stalls name, new beach name, new social values, and local names of *C. equisetifolia*. *Cemoro laut* and *cemoro pantai* were frequently mentioned instead of *Casuarina* or *cemara/cemara udang* (*C. equisetifolia* in Indonesian language) by coastal inhabitants in Parangkusumo Beach, Depok Beach, and Samas Beach (19%) and Depok Beach (1%) respectively. In addition, finding about coastal inhabitant's perception difference in understanding the prohibition limits related to the use of *C. equisetifolia* must be given more attention. Fact shows that the prohibition that understood by coastal inhabitant was prohibited to damage (29%), followed by to cut (19%), to take (13%), and others.

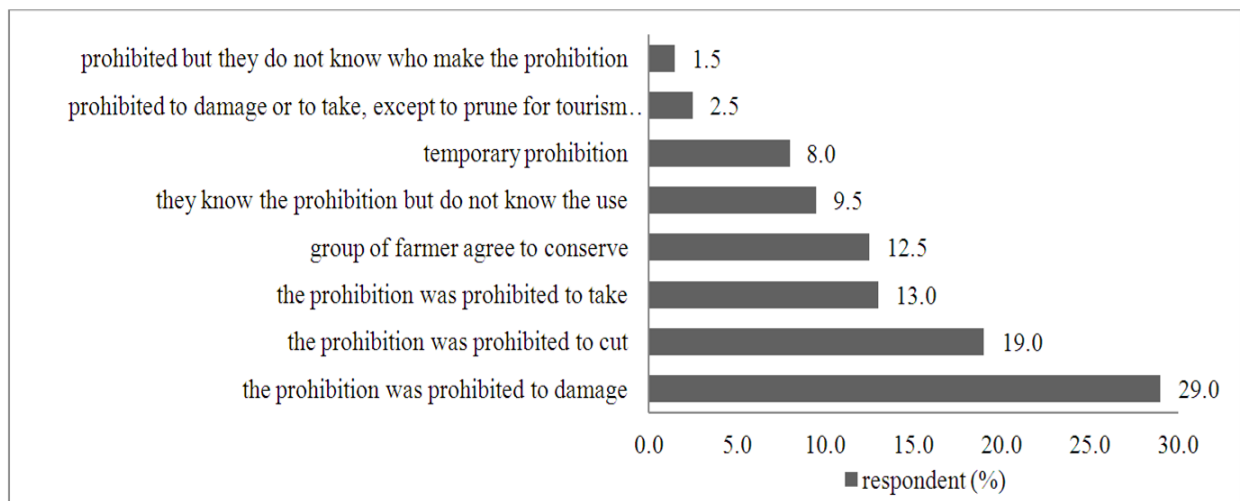


Fig. The perception of respondents about the prohibition related the use of *C. equisetifolia*

Based on the social value set up, if damage occurred, coastal inhabitant will be sanctioned by the replacement of ten seedlings of *C. equisetifolia*. They were also not prioritized to get the government's support, and not getting an area in the coast. Nowadays coastal inhabitant has commitment to produce more *C. equisetifolia* seedlings. Practicing an air layering was a popular way to reproduce a seedling of *C. equisetifolia*. On the other hand more attention should be given to ecosystem changing due to the

(様式 5) (Style5)

spreading of *C. equisetifolia* to avoid invasion of exotic species. Conservation and management must consider the complex mosaic of coastal zones, because each coastal element will respond differently to people alteration. Negative effects of this species as serious invader have been reported such as 1) cause the other exotic species occupy below the canopy of beach sheoak, 2) inhibit the growth of native plants, 3) open beaches and dunes, 4) erosion, and 5) allelopathic effect. Negative effects of *C. equisetifolia* either ecological or socio-economic condition must be also monitored by time.

Table. Planting pattern and locations where *C. equisetifolia* distributed along the southern coast of Yogyakarta after sixteen year (1996-2012)

No	Name of beach or sand dune	Village	District	Regency	Plantation pattern ²				
					1	2	3	4	5
1	Congot	Jangkaran	Temon	Kulonprogo	-	-	█	●	□
2	Glagah	Glagah			-	-	█	●	□
3	Karangwuni	Karangwuni	Wates		-	-	█	●	-
4	Garongan	Garongan	Panjatan		-	-	█	-	□
5	Pleret	Pleret			-	-	█	●	□
6	Bugel	Bugel	Galur		-	-	█	●	□
7	Karangsewu	Karangsewu			-	-	█	●	-
8	Trisik	Banaran			-	-	█	●	-
9	Pandansimo	Poncosari	Srandakan	-	-	█	●	-	
10	Baru			-	▲	█	●	-	
11	Kuwaru			-	-	█	●	□	
12	Patehan (Gua cemara)	Gadingsari	Sanden	-	-	█	●	□	
13	Pandansari			-	-	█	●	□	
14	Samas	Srigading	Kretek	≤	-	█	●	□	
15	Depok	Parangtritis		-	-	█	●	□	
16	Parangkusumo			-	-	█	●	□	
17	Parangtritis sand dune			-	-	█	●	-	
18	Parangtritis			-	-	-	█	●	-
19	Gesing	Girikarto		Purwosari	-	-	-	●	-
20	Ngrenehan	Kanigoro	Saptosari	-	-	-	●	-	
21	Kukup	Kemadang	Tanjungsari	-	-	-	●	-	
22	Sepanjang			-	-	-	█	●	-
23	Drini	Ngestirejo	Gunungkidul	-	-	-	●	-	
24	Krakal	Sidoharjo		-	-	-	█	●	-
25	Sundak			-	-	-	█	●	-
26	Indriyani	Tepus	Tepus	-	-	-	█	●	-
27	Siung	Purwodadi		-	-	-	█	●	-
28	Sadeng	Pucung and Songbanyu	Girisubo	-	-	-	█	●	-
Total		21	13	3	1	1	17	27	11

[2] plantation pattern of *C. equisetifolia*: 1. oblique comb (≤), 2. *untu walang* (▲), 3. rows formation (█), 4. individuals (●), and 5. rectangles (□), whereas (-) was not found the same pattern within one column or no data.

(注) 要約の分量は、学位論文の分量の約 10% として下さい。図表や写真を含めても構いません。

(Note) The Abstract should be about 10% of the entire dissertation and may include illustrations

(様式 5) (Style5)