Evaluation of Growth and Health of Teak Plants (Tectona grandis Linn.f) Age 15 Years in the Ultisol Soil

by Yusanto Nugroho

Submission date: 13-Sep-2018 02:04PM (UTC+0700)
Submission ID: 1001174467
File name: 10.5923.j.ijaf.20180804.04_-_jurnal_kedua.doc (428.45K)
Word count: 3896
Character count: 20801

International Journal of Agriculture and Forestry 2018, 8(4): 155-159
DOI: 10.5923/j.ijaf.20180804.04

Evaluation of Growth and Health of Teak Plants (*Tectona grandis Linn.f*) Age 15 Years in the Ultisol Soil

Yusanto Nugroho, Suyanto, Eva Prihartiningtyas, Rahmawati

Faculty of Forestry, University of Lambung Mangkurat, Indonesia

Abstract The development of teak on ultisol land is the development of plant outside its natural distribution, the condition of ultisol soil which varies cause high variation of plant in the field. This study aims to evaluate the growth and health of teak plants at the age of 15 years planted in ultisol soil in the Indonesian province of South Kalimantan. The study method consisted of determining the location of teak plants spread over 3 blocks of soaking, measuring soil physical and chemical characteristics including volume weight, bulk density (BD), porosity, solum, effective depth of soil, rock percentage. Soil chemistry characteristics includes soil pH, Ca and P elements. Measures of growth include height and diameter as well as plant volume. Measurement of plant health by using damage index of tree / area with attribute of location of damage, type of damage and damage severity. The results showed that the existence of land variation on ultisol soil significantly influence on the growth of teak plants. Likewise with the results of plant health identification showed there is a very real effect caused by the location difference with the characteristics of the land it has on the health value of plants produced ($P < 0.001$). Several parts of ultisol soil zonation in South Kalimantan possessing good soil characteristics especially deep soil solum, neutral soil pH to slightly alkaline, Ca and P content with medium to high classification provide the best growth and health response compared to land zoning on ultisol soils with acidic soil properties, low soil solum and low Ca and P elements.

Keywords Teak, Ultisol Soil, Growth, Plant Health

1. Introduction

Teak (*Tectona grandis* Linn. f) is a commercial plant and includes luxurious wood and has a high economic value (Bermejo et al., 2003). Teak has strong class and durable class with classification II (Nugroho, 2015; Martawijaya et al, 1989). Teak is generally developed in areas with a degree of neutral to slightly alkaline acidity (Zhou et al., 2011; Purwowidodo, 1991). The development of teak on ultisol soil is an effort to develop teak plants outside its natural distribution (Nugroho, 2015). Ultisol soil is an advanced soil, with relatively more acidic soil pH, clay accumulation in the lower horizon, acidic, basic saturation at a depth of 180 cm from the soil surface of less than 35% (Hardjowigeno, 2003). Ultisol soil in South Kalimantan Province has characteristic that there is sporadic lime intrusion of rocks so that at certain locations have alkaline soil pH.

Teak plants beyond their natural distribution such as teak development on ultisol soils have a risk of a wide variety of plant growth. Ultisol soils in South Kalimantan also provide a variety of soil characteristics that allow it can be a limitation on the growth of teak plants. Several teak plant studies on ultisol soil in South Kalimantan mentioned that there were variations of teak plant growth at the age of 4 years (Muslim, 2006; Rizal 2007; Rohana, 2010). Teak growth variation is quite high even in the third year of many deaths at soil pH conditions of 4.5 to 5.2 in Sumatra Province (Silaban et al. 2008).

Soil acidity is one of the factors that limits the growth and development of teak plants (Kaosa-ard, 1998). To grow optimally the teak also requires high calcium (Ca) and phosphorus (P) (Purwowidodo, 1991). Teak is also a species that is calcicolous, this characteristic is characterized by the need for a relatively large amount of calcium for the growth of teak (Zhou et al., 2011; Purwowidodo, 1991). The physical characteristics of soils that play a role in the growth of teak are deep soil solum, good soil drainage and low bulk density (Nugroho, 2015; Rugmini, 2007).

Teak plant developed in Ultisol soil of South Kalimantan Province has a variety of soil characteristics, both physical properties of soil and chemical properties of the soil. Therefore, research is needed to evaluate the growth and health of teak plants in developed on ultisol soil with various land conditions, so that can be analyzed land condition in ultisol soil that can give good growth performance to teak plant. Plant health is important to provide an analysis that good growth includes not only high growth and diameter but

Published online at http://journal.sapub.org/ijaf

no less important is plant health. This study aims to evaluate the growth and health of teak plants at the age of 15 years planted in ultisol soil in the Indonesian province of South Kalimantan.

2. Research Methods

The study sites was conducted on teak plantation area which was planted on ultisol soil which is administratively located in Banjar Regency of South Kalimantan Province. The study sites have flat topography until wavy, located at an altitude of 40-110 meters above sea level. It has a climate type B and a Rainfall average of 2,500-3500 mm/year, has an average moisture of 72-84% and an average temperature of 21°-34°C (Anonymous, 2009).

The data collection procedure in the field is done by direct measurement in the field. The way of data collection of each parameter is done as follows:

1) Determine the sample point by considering the map of the location of teak plants on ultisol soil by using three plant locations. Measuring soil characteristics at the teak plant site includes soil physical and chemical.
2) Measuring the nature of Soil Physics by measuring the weight of soil volume, bulk density, soil porosity, soil solum, into effective soil, percent gravel or rock.

Calculation of root percentage.

$$\text{Percent rooting} = \frac{\text{Total Root Area}}{\text{Area of Observation Area}} \times 100\%$$

Persen rocks in the soil profile, by making an observation plot 1 x 1 m then measuring the area of each rock in the observation plot and calculating the percent of rocks by the formula:

$$\text{Percent of gravel/rock} = \frac{\text{Total Area of Rock}}{\text{Area of Observation Area}} \times 100\%$$

3) Measuring soil chemical properties by measuring soil pH, calcium (Ca) and phosphor (P) levels.
4) Measuring the nature of plant growth by measuring the height and diameter of teak plants. Height is measured at clearbole height and diameter is measured in diameter at chest height, then calculation of plant diameter. Measurement of growth in each block of test plant was done with 3 measurement plots, using circle method with diameter of circle 7,94 m (Nugroho, 2015). The stem volume calculation with reference to the formula used by Simon (1993) is:

$\mathbf{V = ¼\ \pi.d^2.t.f}$ (information: V = Volume; t = height; D = diameter; f = form factor (0.7); π = constant 22/7 or 3.14).

5) Plant health

Plant health observations were conducted at the individual plant level using the method developed by Alexander (1996), these measurements include location of damage, type of damage, and severity. The location of the damage indicates the location where the damage occurred measured from the roots to the leaves. Type of damage to plants is the type of damage that appears on the plant. Type of damage indicates the presence of abnormalities that appear on the parts of the plant. The severity of the damage is the number (area) of the affected area above the threshold value at the location and the specific type of damage. Severity assessment shows the percentage of damage to the plant, which is classified by weight or value against attack or damage that arises on the parts of the plant. Plant health is the sum of the observed plant damage. The component of the damage indicator is the location of the damage, the type of damage and the severity of the damage calculated by using the index of tree damage index and area damage index (Alexander 1996). A minimum tree is calculated index of tree damage maximum 3 types of damage that is considered the heaviest cause damage to the tree.

Data analysis used variance analysis with one way classification (Yitnosumitro, 1993; Gomez & Gomez 1995) with analytical tool assisted by statistic analysis using sigma plot software version 12.

3. Results and Discussion

1. Physical and Chemical Soil Characteristics at Planting Sites

Measurement of physical soil characteristics is done by making a soil profile (Hardjowigeno, 2003). The characteristics of the profile can be derived from the soil physical properties consisting of soil solum, the effective depth of the roots, bulk density, porosity and percentage of roots and the percentage of rocks. The results of the soil physical and chemical characteristics measurements are shown in Table 1.

Table 1. Physical and Chemical Soil Characteristics of Planting Location

No.	Average	Planting Location		
		Block 1	Block 2	Block 3
1.	Soil Solum (cm)	150	90	80
2.	The effective depth of the root (cm)	110	55	60
3.	BD (g/cm^3)	1,15	1,32	1,30
4.	Soil Porosity (%)	48,09	32,40	33,40
5.	Rock Precentage (%)	12,37	20,89	29,86
6	Rooting Precentage (%)	20,19	9,79	7,70
7	Soil pH	6,4	5,1	5,0
8	Ca Content (me/100g)	10,70	3,48	3,60
9	P Content (ppm)	6,17	3,10	2,30

The soil solum is the depth of the soil composed by horizon A and horizon B (Hanafiah, 2012), this soil solum is an area for growing rooting plants. At the planting site block 1 shows the depth of the soil solum and the deeper depth of deep roots compared to block 2 and block 3. The other physical properties of the soil indicate that the soil in block 1 shows better soil properties including smaller bulk density,

with larger porosity of soil, greater percentage of roots and percent of rocks indicating less mechanica barriers. Block 2 and Block 3 shows the physical properties of the soil more equally.

Besides the soil physical properties, the soil chemical properties of block 1 show better soil chemical properties compared to block 2 or block 3, eespecially at soil pH and calcium phosphor content (P) in the soil. This variety of soil physical and chemical properties is important to analyze the impact of the soil properties on the growth of teak plants. The result of measurement of physical and chemical properties of soil in the three planting location blocks shows that on the soil of ultisol in South Kalimantan there are also variations of soil physical and chemical properties which can enable different growth of teak plants on it.

2. Evaluation of Growth

Teak plant growth is influenced by internal factor of teak plant genetic and external form of physical environment condition (Na'iem, 2005). A good physical environment condition is crucial to the optimization of teak plant growth in the field. The results of observation of plant growth on 3 blocks of teak plant site on ultisol soil (Table 2) at age 15 years in the field showed that the difference of planting block on ultisol soil gave the difference of plant growth especially in high growth and volume growth (alpha = 5%), while high growth shows no difference. These results indicate that the presence of soil characteristics variation in ultisol soil that causes variation in the growth of teak plants.

Table 2. Growth of Teak Plant on Various Planting Blocks

Planting Block	Average Height (m)	Average Diameter (cm)	Average Volume (m^3/ha)
1	$17,62^{ns}$	22^{b}	204^{b}
2	$12,81^{ns}$	20^{b}	154^{a}
3	$10,13^{ns}$	14^{a}	95^{a}

Information:
Mean : 151
Standard deviation : 38.38
Leaat Significant Different (LSD) : 79.03
ns : not significant
a, b : differentiator of LSD real difference test

The location of the block 1 plant has soil properties, especially the deep depth of soil solum, neutral soil pH and high calcium (Ca) and phosphorus (P) content provide the best plant growth compared to teak growth in blocks 2 and 3 with pH more acid soils and smaller Ca and P elemental content. The soil solum with more than 90 cm cadres included in the deep category (Arsyad, 1989; Purwowidodo, 1991). The thickness of this soil solum is indispensable for teak plants for optimal growth (Zhou et al., 2011; Rugmini, 2007; Sumarna, 2001). The thickness of the soil solum and the low bulk density cause the plant roots to grow more easily and penetrate the soil layer (Nugroho, 2015, Hardjowigena, 2003).

Rooting that much will cause the root range to take up more nutrients so that the nutrients for plant growth are more fulfilled. Rock percentages also contribute to the growth rate of teak plants. The percentage of rocks represents the amount of mechanical barriers for root development, the more percent the rock will increase the mechanical barrier to the development of rooting, because the roots are not able to penetrate rocks and dense soils (Nugroho, 2006). Variety of land conditions on ultisol soil indicates that not all land conditions on ultisol soil produce good teak growth, therefore land zonation on ultisol land is required for the development of teak plants. This zonation is based on the growing requirements of teak plants, especially the depth of soil solum, bulk density, soil pH, calcium and phosphorus (P) in the soil (Zhou et al., 2011; Rugmini, 2007; Sumarna, 2001; Purwowidodo, 1991).

3. Teak Plant Health (*Tectona grandis* Linn. f)

Identification of teak plant health at the age of ± 15 years shows the varied data on each planting block. Health identification on each planting block based on location of damage, type of damage and damage severity. The result of plant health identification according to index of area damage is the average of the whole index of tree damage on all plots of measure. The area damage index provides a value to explain the overall health of the plant on the planting block. Results Measurement of plant health is shown in Table 3.

Table 3. Teak Plant Health based on area damage index (IKA)

Planting Block	Identification of Area Damage (IKA)	Classification of Damage Levels
1	$5,33^{a}$	Medium
2	$6,20^{a}$	Medium
3	$8,73^{b}$	Rather Heavy

Information:
Mean : 6.75
Standard deviation : 0.39
LSD : 0.88

The teak plant identification data of each planting block showed moderate (5.22-8.70) to moderately severe (8,70-12,18) crop damage levels. Based on the result of variance analysis of plant damage level at teak location showed that there was a very real difference caused by the difference of location with the properties of the land they have on the health value of the produced plants ($P < 0.001$). Land with good soil properties will produce good teak growth, this may be caused by calcium and phosphor content factors on the land. According Purwowidodo (1991) teak plants including calcicolous type means to require more calcium in order to optimize its growth, so that on land that lack of calcium element will experience disruption in its growth.

Identification of plant health based on the location of the damage or site of damage indicates that the damage to the teak plant is almost evenly distributed on the parts of the plant (Table 4).

Table 4. Percentage of Site Occurrence of Damage to Plant Section

No	Definition	Percentage of Events by Location of damage (%)
1	Roots and crops	1,10
2	Roots and lower stems	0,74
3	Bottom rod (half the bottom of the stem between the stump and the bottom of the header)	6,25
4	Bottom and top of the stem	4,04
5	The top of the stem (the upper half of the stem between the stump and the header base)	23,90
6	Header rods (main trunk within the header area, on the basis of the header of life)	28,68
7	Branches	14,71
8	Buds and sprout	18,38
9	Leaves	2,21
Total		**100**

The percentage of damage location in the table above shows that the location of the damage occurred in 9 parts of the plant. Most of the damage occurred in the header section of 28.68% and the top of the stem (upper half of the stem between the stump and the header base) was 23.90%. Damage to this part of the stem should be taken seriously in the activities of plant maintenance because the stem is a valuable part for the ultimate purpose of harvesting (Sumardi and Widyastuti, 2004). Damage to the growth of buds and sprout by 18.38%, and on the branches of damage by 14.71% with the attack on the branch is the emergence of parasites that take nutrients from the branches of plants, according to Hasanbahri et al (2014) parasite attack teak plants on the branches that form the header, at this location parasite shows the greatest attacks that occur in all age classes reach 12-20%.

Table 5. Percentage Type of Damage to Plant Section

No	Definition	Percentage of Events by Location of damage (%)
1	Cancer	2,21
2	Mushroom / termite attack	8,82
3	Open wounds	22,43
4	*Gummosis*	18,75
5	Stem or roots broke	8,46
6	Brooms on roots or stems	3,31
7	Losing buds	12,13
8	Broken or dead	1,47
9	Excessive branches	2,57
10	Damage to leaves or shoots	9,19
11	Leaf color changes	5,51
12	Liana	5,15
Total		**100**

Identification of teak plant health based on the type of damage to the affected plant indicates the occurrence of abnormalities in the plant, there are 12 types of damage to the teak plant (Table 5).

The percentage of damage types in Table 5 shows that most types of damage are open wounds of 22.43% and gummosis of 18.75%. According Kuswanto (2003) open wounds can occur as a result of pest attacks on the order of coleopteran that can damage the skin to the cambium. While gummosis occurs as a result of high rainfall so that open wounds due to errors in pruning and pest attacks cause easy stem infection that causes gummosis. Based on the type of attack that occurs mostly related to the management activities of the plant, especially the maintenance of plants such as pruning branches, clearing the land except on the leaf color changes that allegedly comes from soil fertility (Nugroho, 2015). The growth of mushrooms and some other teak pests can occur due to climate factors (temperature and humidity), soil, altitude and biological factors such as weeds as host (Sumardi & Widyastuti 2004; Kuswanto 2003).

Identification of teak plant health based on the severity of the observation results indicates that the severity of damage varies from 10% to 80% with interval 10. Severity of damage at the site of damage to the teak plant can be seen in Table 6.

Table 6. Percentage of Severity of Plant Damage

No	Severity	Percentage of Events by Location of damage (%)
1	10-19 %	0,37
2	20-29 %	15,07
3	30-39 %	45,22
4	40-49 %	27,57
5	50-59 %	7,35
6	60-69 %	4,04
7	70-79 %	0,00
8	80-89 %	0,37
Total		**100**

The greatest damage severity occurred in the severity 3 (30-39%) and 4 (40-49%) with the percentage of 45.22% and 27.57%. According Irwanto (2006) the severity of damage that attacks the teak plant can reach 20-70% in each type of damage. According to Hasanbahri et al. (2014) the severity of damage can reach 20% due to parasite attacks on teak plants occur in the young age class and in the old age class.

4. Conclusions

Teak plants have a fairly high prospect on ultisol soil, however ultisol soils have a diverse range of land properties, not all land zoning on ultisol soil can be developed teak plants. Land zoning on ultisol soils based on the growing requirements of teak plants, especially the depth of soil solum, bulk density, soil pH, calcium and phosphor (P) content in the soil will provide assurance of optimally growing teak growth. So also with plant health, teak plant

health identification data of each planting block shows the level of damage to plants with moderate to slightly heavy classification. Based on the result of variance analysis of plant damage level at teak location showed that there was a very real difference caused by the difference of location with the properties of the land they have on the health value of the produced plants ($P < 0.001$). Some parts of ultisol soil zonation in South Kalimantan possessing good soil properties especially deep soil solum, neutral to slightly alkaline soil pH, Ca and P content with medium to high classification provide the best growth and health compared to land zoning at ultisol soils with acidic soil properties, low soil solum and low Ca and P elements.

REFERENCES

[1] Anonimous. 2009. Rancangan Pemanfaatan Areal Taman Hutan Raya (TAHURA) Sultan Adam. Banjarbaru: Dinas Kehutanan Provinsi Kalimantan Selatan.

[2] Alexander S.A, 1996. *Forest Health Monitoring Field Methods* Guide, Environmental Monitoring Systems Laboratory. Las Vegas.

[3] Bermejo I, Isabel Canellas I, Miguel A.S. 2003. *Growth and yield models for teak Plantations* in Costa Rica. Forest Ecology and Management. 189: 97–110.

[4] Gomez K.A, Gomez A. A. 1995. Prosedur Statistik Untuk Penelitian Pertanian Terjemahan Sjamsuddin E dan Baharsjah J.S. Edisi Kedua. Publisher University of Indonesia (UI-Press). pp 698 McGraw-Hill. Inc. Pp. 748.

[5] Hanafiah KA. 2012. *Dasar-Dasar Ilmu Tanah.* Jakarta: Publisher Rajawali Press.

[6] Hardjowigeno S. 2003. *Ilmu Tanah.* Jakarta: Publisher Akademika Pressindo.

[7] Hardjowigeno S. 2003. *Klasifikasi Tanah dan Pedogenesis.* Jakarta: Publisher Akademika Pressindo.

[8] Hasanbahri S, Marsono D, Hardiwinoto S, Sadono R. 2014. Serangan Benalu Pada Beberapa Kelas Umur Tanaman Jati Di Wilayah Hutan BKPH Begal, KPH Ngawi, Jawa Timur. Jurnal Manusia dan Lingkungan. Center for Environmental Studies Gadjah Mada University. 21: 195-201.

[9] Irwanto. 2006. Usaha Pengembangan Jati (*Tectona grandis* L.F). Article http://www.irwantoshut.com.

[10] Kaosa-ard A. 1998. *Overview of problems in teak plantation establishment.* In: Kashio Masakazu and Kevin.

[11] Kuswanto, 2003. Perlindungan Hutan (Penyakit Hutan). Agroforestry Faculty Gadjah Mada University, Yogyakarta.

[12] Martawijaya, A., I.K.Sujana., Y.I. Mandang, S. Amang., P.K. Kadir., 1989. *Atlas Kayu Indonesia Jilid II*. Badan Penelitian dan Pengembangan Kehutanan. Bogor.

[13] Muslim. 2006. Analisis Pertumbuhan dan Kualitas Hidup Tanaman Jati (*Tectona grandis* Linn) di Kabupaten Banjar Kalimantan Selatan. Faculty of Forestry Lambung Mangkurat University of Banjarbaru.

[14] Na'iem M. 2005. Upaya Peningkat Kualitas Hutan Jati Rakyat. Prosiding Pertemuan Forum Komunikasi Jati IV. Tema Pengembangan Jati Unggul Untuk Peningkatan Produktivitas Hutan Rakyat. Yogyakarta. 2005.

[15] Nugroho, Y. 2006. Sistem Perakaran Sengon Laut (*Paraserianthes falcataria* (L) Nielsen Pada Lahan Bekas Penambangan Tipe C di Kecamatan Cangkringan Kabupaten Sleman DIY.

[16] Nugroho, Y. 2015. Analisis Kualitas Lahan Untuk Pengembangan Model Pertanaman Jati (Tectona grandis L.F) Rakyat di Tropika Basah. Disertation of Brawijaya University Malang.

[17] Purwowidodo, 1991. Gatra Tanah dalam Pembangunan Hutan Tanaman. IPB Press. Bogor.

[18] Rizal H. 2007. Analisis Riap Tahunan (MAI) Hutan Rakyat Jati dan Karet Di Desa Karanagan Putih Kecamatan Kalua. Kabupaten Tabalong Kalimantan Selatan. Faculty of Forestry Lambung Mangkurat University of Banjarbaru.

[19] Rugmini P, Balagopalan M, Jayaraman K. 2007. *Modelling the growth of teak in relation to soil conditions in the Kerala part of the Western Ghats (Final Report of the Research Project* No. KFRI/431/2004 April 2004 - March 2007). KFRI Research Report No.284A. ISSN 0970-8103.pp 46.

[20] Rohana G. 2010. Prediksi Riap (*Increament*) Beberapa Jenis Tanaman Pada Program GN-RHL di Kabupaten Banjar Kalimantan Selatan. Faculty of Forestry Lambung Mngkurat University of Banjarbaru.

[21] Silaban Y. L, Setyawan D, Warsito. 2007. Potensi Kendala Pengembangan Tanaman Jati di Lahan rawa Lebak Ogan Hilir. Prosiding pada Seminar Potensi dan Tantangan Pembudidayaan Jati Di Sumatera. Balai Penelitian dan Pengembangan Kehutanan, Pusat Penelitian dan Pengemban gan Hutan Tanaman. Sumatera ISBN: 978-979-3819-46-4.

[22] Simon H. 1993. Metode Inventori Hutan, Aditya Media Yogyakarta.

[23] Sumardi, Widyastuti S.M. 2004. Dasar-dasar Perlindungan Hutan. Gadjah Mada Univ. Press. pp. 89.

[24] Sumarna Y. 2001 Budidaya Jati. PT. Penebar Swadaya. Jakarta. pp 124.

[25] Yitnosumarto S. 1993. Percobaan, Perancangan dan Interprestasinya. Publisher PT. Gramedia Utama. Jakarta. Pp 297.

[26] Zhou Z, Liang K, Xu D, Zhang Y, Huang G, Ma H. 2011. *Effects of calcium, boron and nitrogen fertilization on the growth of teak (Tectona grandis) seedlings and chemical property of acidic soil substrate*. DOI 10.1007/s11056-011-9 276-6. New Forests. 43: 231–243.

Evaluation of Growth and Health of Teak Plants (Tectona grandis Linn.f) Age 15 Years in the Ultisol Soil

ORIGINALITY REPORT

14%	13%	3%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.innspub.net Internet Source	5%
2	article.sapub.org Internet Source	4%
3	www.sapub.org Internet Source	2%
4	www.tcare.ca Internet Source	1%
5	Wiersma, G, J Elvir, and J Eckhoff. "Efficacy of Forest Health Monitoring Indicators to Evince Impacts on a Chemically Manipulated Watershed", Environmental Monitoring, 2004. Publication	<1%
6	Lardo, Egidio Palese, Assunta Maria Nuzz. "Variability of total soil respiration in a Mediterranean vineyard.(Report)", Soil Research, August 2015 Issue Publication	<1%

7	repository.unib.ac.id Internet Source	<1%
8	Zaizhi Zhou. "Effects of calcium, boron and nitrogen fertilization on the growth of teak (Tectona grandis) seedlings and chemical property of acidic soil substrate", New Forests, 06/28/2011 Publication	<1%
9	www.scipublish.com Internet Source	<1%
10	ppjp.unlam.ac.id Internet Source	<1%
11	Tropical Forestry Handbook, 2016. Publication	<1%

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		