Perception on the Constraints to Propagation of Iroko (*Milicia excelsa*) (WELW) C.C. BERG in South West Nigeria

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ABSTRACT

The problem of population growth, development and economic pressure has resulted in a high rate of deforestation of the country’s natural resource. The rate of disappearance of *Milicia excelsa* in the forests is alarming with West Africa being the hardest hit by the trend. *Milicia* suffers heavy exploitation due to its wood quality but they are not replaced for sustainability. A survey was conducted in five states of South West Nigeria (Oyo, Ogun, Ondo, Osun and Ekiti) to assess the perceptions of some communities on the problems associated with propagation of *Milicia excelsa*. A structured questionnaire was administered to the 125 respondents randomly selected from the five states of the study area. Eighty percent (80%) of respondents do not plant *Milicia* species because of slow growth (35.2%), bush burning (10.4%), religious beliefs (8.8%) and lack of seeds (45.6%). Awareness of Iroko gall bug (*Phytolyma lata*) as major constraints to propagation of *Milicia excelsa* was low (49.6%). There was a significant positive correlation (p<0.01) between the states and people’s belief about *Milicia excelsa*. However, negative correlation was found between the states and awareness of *P. lata* as major constraints. Therefore, there is need to encourage the communities to propagate *M. excelsa* through agro forestry by providing them with planting materials (seed) and training on the available control measures for *P. lata* infestation on *Milicia*.  

Key words: *Milicia excelsa*, constraints, propagation, sustainability, community

INTRODUCTION

Rural populace in the tropical countries have a long tradition of planting trees on their land for producing a wide range of timber and non-timber forest products for meeting their livelihood needs and the needs of the wood-based industry and also for providing environmental benefits (Evans, 1992; FAO., 1997). Currently, such small-scale farming of tree planting still considerably exceeds the rate of industrial or large-scale forest plantation establishment which is of moderately recent origin in the tropics (Otsamo, 2000). There is a significant shift in timber production from natural forests to plantations with subsequent large-scale development of industrial fast-growing plantation forestry especially on degraded lands, has been predicted in tropical forestry (Sayer *et al.*, 1997).

FAO (2001) also acknowledges this trend towards greater reliance on plantations as a source of industrial wood. This trend is accelerated because of problems experienced with present forest management systems but most of all because of the need to keep up with the demands for forest
products (FAO, 2001). Brown (2000) estimated that the area of effective tropical and subtropical plantations covered a total of 55 million hectares which is 45% of global plantation forest resource. Generally, forest plantations in the tropics are dominated by Eucalyptus and Pinus spp. even though other species such as Gmelina spp., Swietenia spp., Tectona grandis and acacia are also attractive plantation species (Brown, 2000).

*Milicia excelsa* (Welw) C.C. Berg. Moraceae is an important economic tree species in West Africa. It is a highly valued commercial timber in African timber market known as iroko. The timber is strong, moderately hard and very durable with interlocked and sometimes irregular grains. It seasons well in air or kiln and does not warp or shrink afterwards (Irvine, 1961; Farmer, 1975). It is highly resistant to termite and fungi attacks (Irvine, 1961; Farmer, 1975).

The wood is extensively used due to its high durability and good working properties. There is considerable demand of *M. excelsa* timber, sliced veneer rotary veneer and profile boards for decorative and structural uses. The wood is also used for fences, furniture and other constructional purposes and represents a substantial portion of the timber and furniture export income, especially of Ghana and Côte d’Ivoire (Nichols, 1997). Despite the potential of *M. excelsa*, there is little or no propagation of this plant and the regeneration from the wild cannot commensurate the demand for *Milicia* timber in Africa. International Union for Conservation of Nature (IUCN) has placed *Milicia* in their red list as endangered species. Efforts at propagating it have been severely constrained by *Phytolyma lata* attack. Currently, there is dearth information on the community perception on the constraints to propagation of *Milicia excelsa* in Nigeria. Therefore, this study reports the perception of some communities on the constraints to *Milicia excelsa* propagation in South West Nigeria.

**MATERIALS AND METHODS**

**Study area:** The study area is South Western Nigeria which consists of Lagos, Ogun, Oyo, Osun, Ondo and Ekiti states. It is also known as the South West geographical zone of Nigeria. The area lies between longitude 2°31’ and 6° 00’ East and latitude 6°21’ and 8°37’ N (Agboola, 1979) with a total land area of 77,818 km² and a projected population of 28,767,752 in 2002 (NPC., 2002). The study was conducted in five states of South West Nigeria (Fig. 1).

**Sampling procedure:** A multistage sampling technique was used to achieve the respondents for the purpose this study. The first stage was the selection of five states in South West Nigeria namely; Oyo, Osun, Ogun, Ekiti and Ondo. The second stage was selection of five locations in each state using the stratified random sampling technique. The local governments of the selected locations in each state were identified. Twenty five Local Government Areas were surveyed (Egbeda, Saki West, Ido, Akinyele and Kajola) in Oyo states, (Iwo, Ayedade, Ola-oluwa, Osun East and Irewore) in Osun state, (Ijebu-East, Odeda, Imeko, Ita oba and Yewa) in Ogun state, (Odigbo, Okitipupa, Ondo West, Owo and Ose) and (Ire, Oye, Ifelodu, Ilajemeji and Gbogo) in Ondo and Ekiti states respectively. The third stage was selection of five respondents from each location of the selected Local Government Areas.

**Source of data and analytical techniques:** Primary data was used for this study. This was obtained by using a well-structured questionnaire. The respondents were forestry stake holders (farmers, saw millers, civil servants and traders). Twenty five structured questionnaires were administered in each state. A total of 125 questionnaires were administered. The method of
questionnaire administration was by direct contact with the respondents. Data on respondent’s biodata, farming experience, uses of *Milicia*, population of *Milicia*, problems associated with *Milicia* and attitude towards sustaining *Milicia* production were collected. Data collected was subjected to descriptive statistics using SPSS 15.0 for Windows Evaluation version.

**RESULTS**

**Socio-economic characteristics of the respondents:** About 90.4% of the respondents were above 40 years of age. The age range of 41-60 years has the highest percentage (58.4 %) while, the age range of 81-100 years has the least percentage (1.6%). About 82.4% of the respondents were male while 17.6% were female (Table 1).

It was observed that about 97.6% of the respondents were literate and only about 2.4% had no formal education. The educational qualifications of the respondent ranged from primary education to Master’s degree. Respondents with primary education had the highest frequency of 36.0% followed by those with secondary education (24.8%). The respondents with B.Sc. and Master’s degree had the least percentage of occurrence 1.6% (Table 1).

The occupation of the respondents in this study include: Farming, trading saw milling, civil service and forest guards. Farmers have the highest frequency of 44.8% followed by traders 34.4%. The least group of the respondents were the forest guards (0.8%). The respondents with 20-40 years of farming experiences were highest (30.4%), followed by those with 10-20 years of farming experience 28.8% (Table 1).
Table 1: Socio-economic characteristics of the respondents

| Variables          | Frequency | Percentage |
|--------------------|-----------|------------|
| **Age (years)**    |           |            |
| 20-40              | 12        | 9.6        |
| 41-60              | 73        | 58.4       |
| 61-80              | 38        | 30.4       |
| 81-100             | 2         | 1.6        |
| **Total**          | 125       | 100.0      |
| **Gender**         |           |            |
| Male               | 103       | 82.4       |
| Female             | 22        | 17.6       |
| **Total**          | 125       | 100.0      |
| **Education**      |           |            |
| Non-formal education | 3          | 2.4        |
| Primary education  | 45        | 36.0       |
| Secondary education| 31        | 24.8       |
| OND                | 21        | 16.8       |
| NCE                | 7         | 5.6        |
| HND                | 14        | 2.0        |
| B.Sc.              | 11.2      | 1.6        |
| Masters degree     | 2         | 1.6        |
| **Total**          | 125       | 100.0      |
| **Occupation**     |           |            |
| Farming            | 56        | 44.8       |
| Trading            | 43        | 34.4       |
| Saw milling        | 8         | 6.4        |
| Civil service      | 17        | 13.6       |
| Forest guards      | 1         | 0.8        |
| **Total**          | 125       | 100.0      |
| **Farming experience** |           |            |
| 5-10               | 22        | 17.6       |
| 10-20              | 36        | 28.8       |
| 20-40              | 38        | 30.4       |
| 40-60              | 17        | 16.8       |
| 60 and above       | 8         | 6.4        |
| **Total**          | 125       | 100.0      |

Source: Field survey 2011 *OND-Ordinary National Diploma, NCE: National Certificate in Education, HND: Higher National Diploma, B.Sc. Bachelor of science

Table 2: Respondents perception on the uses of *Milicia* and their belief about *Milicia* spp.

| Respondents perception | Oyo | Osun | Ogun | Ondo | Ekiti |
|------------------------|-----|------|------|------|------|
| **Uses of Milicia**    |     |      |      |      |      |
| Income                 | 20  | 40   | 40   | 48   | 92   |
| Object of worship      | 60  | 40   | 4    | 20   | 0    |
| Protection             | 0   | 8    | 8    | 0    | 4    |
| Shade                  | 4   | 4    | 0    | 0    | 0    |
| Medicinal purposes     | 0   | 0    | 24   | 4    | 0    |
| Future use             | 0   | 0    | 12   | 0    | 0    |
| Nothing                | 20  | 8    | 8    | 28   | 4    |
| **Worship of iroko tree** |     |      |      |      |      |
| Yes                    | 44  | 48   | 56   | 40   | 0    |
| No                     | 56  | 52   | 44   | 60   | 100  |

Source: Field survey (2011)

Respondents perception on the uses of *Milicia* spp. and their belief about *Milicia*:
The response revealed that *Milicia excelsa* provides about six different benefits to the communities (Table 2) which include: income, object of worship, protection, provision of shades and medicinal uses. For income, 92% of the respondents in Ekiti state claimed that *M. excelsa* provides income to their community through the sales of timber product, 48% from Ondo state, 40% from both Ogun and Osun state while, only 20% form Oyo state said that milicia provides income to their community (Table 2).
The 60% of the respondents from Oyo state claimed that *Milicia* serves as object of worship for their community, 40% from Osun state, 20% from Ondo and 4% from Ogun state, while none of the respondents from Ekiti state admitted that *Milicia* serve as object of worship. Twenty four percent of respondents from Ogun state claimed that it is used for medicinal purposes, 4% from Ondo state while no respondent from Oyo, Osun and Ekiti indicated that *Milicia* is used for medicinal purposes (Table 2). Observation showed that 56% of the respondents from Ogun state admitted that their community worship iroko tree, 48% from Osun state, 44 % from Oyo state and 40% from Ondo, while none of the respondents from Ekiti admitted that their community worship iroko tree (Table 2).

### Population distribution of *Milicia* species in the study areas:

The results of this study revealed that the population of *Milicia* are very low and are sparsely distributed in the study area. Ekiti state has the highest population of *Milicia* plant, 44% of the respondents admitted that they have 25 and above number of *Milicia* trees, 52% for 10-25 trees and only 4% for 5-10 trees in their community, none of the respondents admitted that they have 1-5 trees or none in their communities.

In Osun state the distribution pattern differs, 28% said that they have 25 and above trees in their community, 12% for 10-25 trees, 16% for 5-10 trees, 44% for 1-5 trees and 0% for none, this indicates the sparse distribution of the tree in the area. In Ondo state, 12% claimed that they both have 25 and above trees and 10-25 trees in their community. In Oyo state, 48 % admitted that they have 10-25 trees in their community while, 0% said that they have 25 and above *Milicia* trees. The trend observed from Ogun state indicates that *Milicia* trees are sparsely distributed in the area than all the states surveyed. Sixty eight percent (68%) claimed that they have 1-5 trees in their community, 20% for 5-10 trees, 4% for 10-20 trees and 8% for 25 and above trees (Table 3).

For seedlings population, only 20% of the respondents from Ogun state admitted that they have 10-30 seedlings in their community. Majority of the respondents from the various states claimed that they have no *Milicia* seedlings in their area or that they have no idea about it (Table 3).

### Attitude towards propagation and sustaining *Milicia* species:

The result revealed that majority of the respondents (79.2%) have very poor attitude towards planting *Milicia* tree in their farm land. Most of the respondents in the five states do not plant *Milicia* in their farm land like other trees, Oyo (60%), Osun (60%), Ogun (88%), Ondo (92%) and Ekiti (95%) claimed that they do not plant *Milicia* tree in their farm. Only 20.8% of the respondents admitted that they plant *Milicia* in their farm (Table 4). The results also revealed that many people have interest in sustaining

| Variables          | Oyo (%) | Osun (%) | Ogun (%) | Ondo (%) | Ekiti (%) |
|--------------------|---------|----------|----------|----------|-----------|
| **Population of Iroko** |         |          |          |          |           |
| None               | 8       | 0        | 0        | 4        | 0         |
| 1-5                | 40      | 44       | 68       | 40       | 0         |
| 5-10               | 4       | 16       | 20       | 32       | 4         |
| 10-25              | 48      | 12       | 4        | 12       | 52        |
| 25 and above       | 0       | 28       | 8        | 12       | 44        |
| **Seedling population** |       |          |          |          |           |
| None               | 24      | 12       | 40       | 28       | 28        |
| 1-5                | 4       | 16       | 4        | 36       | 16        |
| 5-10               | 4       | 12       | 8        | 8        | 0         |
| 10-30              | 0       | 12       | 20       | 0        | 0         |
| No idea            | 68      | 48       | 28       | 28       | 56        |

Source: Field survey (2011)

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Table 4: Attitude towards propagation and sustaining *M. excelsa*

| Variables                      | Oyo (%) | Osun (%) | Ogun (%) | Ondo (%) | Ekiti (%) | Average in 5 states (%) |
|--------------------------------|---------|----------|----------|----------|-----------|-------------------------|
| **Planting of iroko tree**     |         |          |          |          |           |                         |
| Yes                            | 40      | 40       | 12       | 8        | 4         | 20.8                    |
| No                             | 60      | 60       | 88       | 92       | 96        | 79.2                    |
| **Sustenance of Milicia**      |         |          |          |          |           |                         |
| Cut the seedlings when come across it | 40      | 40       | 12       | 8        | 4         | 20.8                    |
| Leave the seedling when come across it | 60      | 60       | 88       | 92       | 96        | 79.2                    |

Source: Field survey (2011)

Table 5: Perception of the respondents on the constraints to propagation of *Milicia*

| Variables                        | Oyo (%) | Osun (%) | Ogun (%) | Ondo (%) | Ekiti (%) | Average in 5 states (%) |
|----------------------------------|---------|----------|----------|----------|-----------|-------------------------|
| **Problems associated with Milicia** |         |          |          |          |           |                         |
| Slow growth rate                 | 58      | 42       | 36       | 46       | 22        | 40.8                    |
| Insects                          | 8       | 8        | 26       | 12       | 16        | 14.0                    |
| Fire                             | 0       | 2        | 6        | 4        | 16        | 5.6                     |
| Lack of seed                     | 34      | 26       | 16       | 8        | 30        | 22.8                    |
| Lack of interest                 | 0       | 12       | 12       | 14       | 10        | 9.6                     |
| Spiritual factor                 | 0       | 10       | 4        | 16       | 6         | 7.2                     |
| **Awareness of Phytolyma lata**  |         |          |          |          |           |                         |
| Yes                              | 44      | 40       | 36       | 48       | 80        | 49.6                    |
| No                               | 56      | 60       | 64       | 52       | 20        | 50.4                    |

Source: Field survey (2011)

*Milicia* even though they may not go into planting it on their own. From 60% and above of the respondents from the study areas admitted that they always leave *Milicia* seedlings in their farm whenever, they come across it (Oyo 60%, Osun 60%, Ogun 88%, Ondo 92% and Ekiti 96%). The percentage of respondents that have interest in sustaining the *Milicia* suggests that the population of the seedlings ought to be high in the study areas but the reverse was the case. This could be attributed to the various factors that were identified by the respondent as the problems associated with the propagation of *Milicia excelsa*.

Respondent’s perception on the constraints to propagation of *Milicia excelsa*: The respondents listed other factors apart from the problem of *Phytolyma lata* that militate against successful cultivation of *Milicia* in the study area. Among them are, slow growth rate of *Milicia* seedlings, unavailability of seeds for those that have interest in planting, bush burning which usually kill the self-propagated ones in the wild annually, insects, lack of interest and religious belief (spiritual factor).

Of all the factors listed, slow growth rate is the main factor militating against propagation of *Milicia* in the study area; Oyo (58%), Osun (42%), Ogun (36%) Ondo (46%) and Ekiti (22%), followed by lack of seeds for propagation Oyo (34%), Osun (26%), Ogun (16%), Ondo (8%) and Ekiti (30%) (Table 5). From the results, the respondents did not identify insects as a major constraints to the propagation of *M. excelsa*, although in Ogun state, 26% of the respondents admitted that insects are one of the factors militating against successful propagation of *M. excelsa* (Table 5). Above 50% of the respondents from the four out of five states surveyed are not aware of *Phytolyma lata* on *Milicia* as propagation constraints, Oyo (56%), Osun (60%), Ogun (64%) and Ondo (52%). However, in Ekiti State, 84% of the respondents admitted that they know the problem of *Phytolyma* on *Milicia* (Table 5). The average percentage awareness of *P. lata* as propagation constraints in five states is 49.6%.

Relationships between different states and *Milicia* population, (Adult plant and seedling population): A significant positive correlation between the *Milicia* population (adult plant) and
Relationship among the states, people’s belief about Milicia species and awareness of Phytolyma lata: A significant positive correlation (p<0.01) was observed between the states and people’s belief about Milicia excelsa while, negative correlation was observed between the states and awareness of Phytolyma lata and between the peoples’ belief and awareness of Phytolyma lata (Table 7).

**DISCUSSION**

Investigation on the importance and uses of Milicia excelsa revealed that M. excelsa is a very important economic tree in the study area. The respondents identified about five different benefits that their communities derive from Milicia plant and these include: Income, object of worship, protection, provision of shades and medicinal uses. According to the respondents, the income derived from Milicia is through the sales of the timber, when a mature tree is cut down or harvested. The wood of Milicia commands a very high prize in the market due to its high quality and demand. This validates the earlier report by Bolza and Keating (1972) that Milicia is a highly valued and commercial timber in Africa, for which the demand is large. Burkill (1997) reported that the M. excelsa tree is used for soil conservation, mulch production, as ornamentals and shade tree. For the medicinal uses, earlier report has shown that various part of Milicia are largely used in traditional medicine (FAO., 1986a, b; Neuwinger, 2000). The result of the population and distribution pattern of Milicia spp. in the study areas showed that the population of adult plant is very low and are sparsely distributed. This suggests that the timber is unsustainably exploited from the natural forests without replacement. This corroborates the report by Ofori and Cobbinah (2007), that the Milicia species timber is unsustainably exploited from the natural forest without replenishment primarily due to attack by P. lata.

Moreover, according to respondents, there were several problems associated with the regeneration and propagation of M. excelsa in the study area. These include: slow growth nature of Milicia, fire problem through bush burning, spiritual problem and unavailability of seeds for propagation. About 37.6% of the respondents in this study, believed that Milicia is a sacred tree and that their communities worship it. They are of the opinion that the tree is spiritual and under ideal condition, it should not be planted by man. The only means of propagation should be through natural selection. Those that manage to grow through natural selection in forest are heavily affected by fire through bush burning.

Due to people’s belief that Milicia is associated with certain spirit, they do not leave it on their farm land, when they see the seedlings and they do not attempt to plant Milicia in their farm land. This report agrees with Neuwinger (2000), who reported that Milicia has a special place in the folklore and tradition of people.
The problem of slow growth of *Milicia* identified by the respondents in the study area as one of the factors militating against propagation of *Milicia* in this study, contradicted the earlier report by Birnie (1997) that *Milicia excelsa* is a fast growing species and coppices readily.

Moreover, the problem of bush burning identified in this study as a major factor militating against the propagation and regeneration of *Milicia*, requires serious consideration and action of the government, as there is no law presently in the country that control indiscriminate bush burning. Bush burning, no doubt contributed to a large extent in reducing the natural propagation of *Milicia excelsa* as, the fruits containing many seeds is being dispersed by bats and birds according to Hawthorne (1995). The percentage of the *Milicia* seedlings, that could have survived in the wild and probably escaped the attack of *P. lata* would have been high but for the fires. This assumption supports the report by White (1964) and Cobbinah and Wagner (1995) that *Milicia excelsa* was found to be attacked by *Phytolyma* in natural forest but not to the same extent as in pure plantations or in nurseries. The problem of unavailability of seeds for the interested farmer was due to the fact that the seeds loses its viability quickly. Pukkala (2000) reported that the seeds germinate best when used in the first three months after collection; however, germination was good up to nine months. Moreover, Borota (1975) reported that seeds were best used within 3 months.

This had discouraged the research institutes in the country (Forestry Research Institute) from preserving the seeds so that the farmer could have access to it whenever they need.

Similarly, the problem of poor storage facilities for seed storage in the country constituted major factor hindering the Research Institutes and interested farmers from short or long term storage of the *Milicia* seeds for future use. ICRAF (1992) reported that mature and properly dried seed can be stored in airtight container at 3°C for at least one year but this is not feasible in Nigeria due to instability in electricity power supply in the country.

Majority of the respondents admitted that they do not plant *Milicia* in their farm. This suggests that people’s attitude towards propagating *Milicia* is very poor and its exploitation is not restricted as at present in this part of the country. This corroborates the report by Ofori (2007), that at the present, the exploitation of *Milicia excelsa* is not sustained in most parts of the country. If, no drastic measure is taken in solving the problem of *Phytolyma lata* in *Milicia*, which is a major constraint to the establishment of plantations of *Milicia* by the foresters, with time *Milicia* will go into extinction, when the existing ones have been harvested.

The communities’ attitude towards sustaining *Milicia* was observed to be very high in this study. Despite their claim of selectively tendering volunteer seedlings, the population of *Milicia* recorded in the study areas was very low. A significant positive correlation between the *Milicia* population (adult plant) and states of study were observed. This suggests that the different states used for the study have variation in their weather condition. Ekiti state recorded the highest population of *Milicia*.

**CONCLUSION**

The study has confirmed that *Milicia excelsa* is a very important economic tree in South West Nigeria, the population of adult plant is very low and are sparsely distributed. The farmers’ attitude towards planting *Milicia* in the study area is very poor. The study also revealed that the communities perception on the constraints to *Milicia excelsa* propagation in South West Nigeria are poor growth nature of *Milicia*, fire problem through bush burning, spiritual problem and lack of seed for propagation. Awareness of iroko gall bug (*Phytolyma lata*) as a major constraint to the establishment of *Milicia excelsa* plantation was low.
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