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Chapter 3

A rapid botanical survey of the Atewa Range Forest Reserve, Ghana

D.E.K.A Siaw and Jonathan Dabo

SUMMARY

A total of 314 plant species belonging to 71 families were recorded during a rapid biological assessment of the Atewa Range Forest Reserve. An additional 30 leaf specimens were pressed for correct identification. At Atiwiredu, 145 plant species in 43 families were recorded, including three black star species *Gilbertiodendron splendidum*, *Psychotria longituba* and *P. subglabra*. At Asiakwa South, 247 species in 65 families were confirmed including one black star species *Ixora tenuis*. At Asiakwa North, 189 species in 53 families were recorded. Among these were four black star species including two recorded only from this site and also listed on the IUCN Red List, *Neolemonniera clitandrifolia* (EN) and *Sapium aubrevillei* (VU).

INTRODUCTION

The Upper Guinea Forest, which includes the forests of Ghana, ranks among the 34 most important biodiversity Hotspots worldwide (Bakarr et al. 2004). This region is highly threatened by exploitation, agriculture and an increasing human population (Bakarr et al. 2001) and remaining fragments of original forest are generally found in remote, inaccessible areas where forest reserves were established a long time ago (Oates 1999).

The Atewa Range is situated in the Moist Semi-Deciduous forest zone with hill vegetation classified by Hall and Swaine (1976) as Upland Evergreen (UE) Forest type. The Upland Evergreen forest in Ghana is known to be botanically very unique in terms of floral richness and diversity. Hall and Swaine (1981) compiled longer botanical species lists in Upland Evergreen forests than in surrounding lowland Moist Semi-Deciduous forests (MSSD). They also noted that Atewa represents an extreme type of provenance for endemic and highly distinct species (e.g. *Aframomum atewae*, *Medinilla enti*, *Anthocleista obanensis*, *Piper capensis*, *Cyathea manii* and *Rubus pinnatus* var. *afrotropicus*). The Atewa Range Forest Reserve (hereafter referred to as 'Atewa') is known to contain some plant species not found elsewhere in Ghana (e.g. *Piper capensis* (Hawthorne and Abu-Juam, 1995)).

The area of Atewa, designated as such in 1925, is 232 km². Seventy-five percent of the slopes within the range are at an angle greater than 15 degrees. Atewa, one of 214 forest reserves in Ghana, is the 43rd Forest Management Unit (FMU 43) and overall has a forest condition score of 3 indicating that it is considered a slightly degraded, ecologically tolerable forest mosaic with healthy and abundant regeneration of timber trees and other forest plants. Animals that like closed forest tend to thrive in this type of mosaic (Hawthorne and Abu-Juam 1993).

Records show that several botanical surveys (16) of Atewa have been conducted since 1971. In 1986, one survey inventoried trees of the DBH greater than 5 cm. Hawthorne and Abu-Juam (1995) reported 656 species of vascular plants at Atewa. These comprised 323 tree species, 83 shrub species, 155 liane and climber species, 68 herbaceous species, 22 epiphytes and 5 grasses. At least five black star species (species of the highest conservation priority in Ghana) and 33 Gold star species have been recorded in Atewa. The black star species include: *Sapium aubrevillei*, *Psychotria subglabra*, *Neolemonniera clitandrifolia*, *Lecaniodiscus punctatus* and *Ixora tenuis*.

Non-botanical forest characteristics, such as steepness of slopes, importance to watershed maintenance, and presence of sacred areas and animal habitats, have been stated as the reasons for the creation of forest reserves in Ghana. Protection of rare plant species and maintenance of biodiversity *per se* was never a stated objective in past designation of forest reserves. However, many of the abovementioned characteristics depend on plant regeneration and redevelopment of tree cover; these in turn influence the ability of animals to flourish in parts of the forest mosaic, as well as sustain the source of streams and rivers in the forest landscape. Flora is an important indicator of the climate, stage of ecological succession, soil type and mineral deposits of any particular area. For example, the occurrence of certain plant species such as *Draceaneae manii* is indicative of the presence of gold deposits (indigenous knowledge, personal comm. – Mr. Ossum).

METHODS

Forest tree and other vascular plant species of three hill summits on the Atewa Range were surveyed from 7 – 23 June, 2006. Temporary Sample Plots (TSP) of 50 m x 50 m and regeneration subplots of 10 m x 10 m were established at each site and vegetation occurring within each plot was identified. Flora of less than 5 cm diameter at breast height (DBH) at a height of 1.3 m was identified inside the subplot. Four TSPs were set up at each RAP survey site using the four cardinal geographic coordinates. A Garmin GPS 76 was used to record georeference positions and altitudes of sample plots.

Additionally, transect walks of at least 6 km were traversed. Existing timber hauling roads, footpaths and lines cut through forest were used as transects. Trees within 20 m on either side of each transect were identified. Leaf samples of plant species that could not be identified in the field were collected and pressed for proper identification at a herbarium in Kumasi.

The periods of June 7-11, 12-17, 18-23, 2006 were spent at Atiwiredu (Site 1), Asiakwa South (Site 2), and Asiakwa North (Site 3), respectively. GPS coordinates for the three sites are given in the Gazetteer of this report.

RESULTS AND DISCUSSION

Appendix 2 shows a summary of the plant species recorded in Atewa during the RAP survey, including species' Star ratings. A total of 71 plant families comprising 314 plant species were recorded during the current biological assessment. An additional 30 leaf specimens were pressed for correct identification. At Site 1, 145 plant species in 43 families were recorded, 247 species in 65 families were confirmed at Site 2, and 189 species were recorded within 53 families were recorded at Site 3. We noted a number of footpaths traversing the forest reserve, many animal traps and signs of illegal chainsaw activity.

The pattern of vegetation and forest quality revealed

that the forest reserve at Site 1, Atiwiredu, was in relatively healthy condition with an average score of 2 (Hawthorne and Abu- Juam 1995), despite the fact that the area was logged in 1991 and there were obvious signs of ongoing illegal logging activities.

Asiakwa South, Site 2, was dominated by the shade-bearing tree *Cola boxiana*. Pioneer species like *Macaranga*, *Trema orientalis*, *Musanga* and *Harungana madagascariensis* occurred in places where the forest canopy was open, especially along hauling roads. Based on our findings, the plant team awarded this site a forest of condition score of 3 (Hawthorne and Abu-Juam 1995). Signs of human activities, like small-scale harvesting of non-timber forest products (NTFPs) such as canes, chewing sticks, and chewing sponge (*Acacia pentagona*), and hunting and trapping game were noticeable in some areas, particularly along the footpath leading to surrounding communities.

Asiakwa North, Site 3, was the least disturbed of the three sites but showed signs of illegal chainsaw operations and hunting. At the sources of three streams within this site, tree ferns *Cyathea manniana* were abundant. *Sapium aubrevillei*, a black star species, was also recorded at this site.

Four black star species known from Atewa (Hawthorne 2002): *Sapium aubrevillei*, *Ixoria tenuis*, *Psychotria subglabra*, and *Neolemonniera clitandrifolia* were observed during this survey. The star rating system adopted by Ghana defines the conservation significance of each forest species in Ghana (Hawthorne and Abu-Juam 1995). The star rating of a species defines its weight for the calculation of weighted average referred to as Genetic Heat Index (GHI) which provides a framework for defining the conservation merit of a tract or sample of forest of any size.

CONSERVATION RECOMMENDATIONS

The biology and ecology of the Atewa black star and endemic species need to be studied further. The sustainable cultivation of non-timber forest product (NTFP) should be encouraged in the surrounding communities. Exploitation that directly affects the main structural elements of the forest, i.e. canopy trees, soils and watercourses, should be limited. However exploitation of non-canopy forest products, for example non-timber forest products (NTFPs), affect only populations of the species being exploited and thus can be managed sustainably.

Rattans are part of the forest ecosystem and depend on forest trees for support. To date no framework for conservation has been devised. This is a major course for concern. Out of four rattan genera found in Ghana, three occur at Atewa and only Site 2 had the genus *Calamus*. A framework for conservation and the sustainable use of bamboo and rattans should be devised.

REFERENCES

- Bakarr, M., B. Bailey, D. Byler, R. Ham, S. Olivieri and M. Omland. 2001. (eds). From the forest to the sea: Biodiversity connections from Ghana to Togo. Conservation priority-setting workshop. December 1999. Conservation International, Washington, DC. 78pp.
- Hall, J.B. and M.D. Swaine. 1981. Distribution and ecology of vascular plants in a tropical rain forest, Forest Vegetation in Ghana. Dr. W. Junk Publishers. The Hague xv + 382 pp.
- Hall, J.B. and M.D. Swaine. 1976. Classification and ecology of closed-canopy forest in Ghana. *Journal of Ecology* 64: 913-915.
- Hawthorne, W.D. 1995. Ecological Profiles of Ghanaian Forest Trees. Tropical Forestry Papers 29. Oxford Forestry Institute (OFI). Forestry Research Programme (FRP). ODA. Forestry Department, Ghana.
- Hawthorne, W.D. and M. Abu-Juam. 1993. Forest Protection in Ghana. Forest Inventory and Management Project. Planning Branch, Forestry Dept., Kumasi, Ghana.
- Irvine, F.R. 1960. Woody plants of Ghana with special reference to their uses. London, Oxford Univ. Press. 1961.
- McCullough, J., J. Decher and D. Guba Kpelle. (eds). 2005. A biological assessment of the terrestrial ecosystems of the Draw River, Boi-Tano, Tano Nimri and Krokosua Hills Forest Reserves, Southwestern Ghana. RAP Bulletin of Biological Assessment 36. Conservation International, Washington, DC.
- Myers, N., R.A. Mittermeier, G.G. Mittermeier, GAB da Fonseca and J. Kent. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403: 845-853.
- Oates, J.F. 1999. Myth and reality in the rainforest. How conservation strategies are failing in West Africa. Berkeley, Univ. of California Press. Xxviii + 310 pp.
- Parren, M.P.E. and N.R. de Graaf. 1995. The quest for natural forests management in Ghana, Cote d'Ivoire and Liberia. Tropenbos Foundation Series 13. Wageningen. 199 pp.
- Taylor, C.T. 1960. Synecology and silviculture in Ghana. Thomas Nelson Co., London.