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Canopy Disturbance and Alien Plant (*Broussonetia Papyrifera L. Vent*) Invasion in the Afram
Headwaters Forest Reserve, Ghana: Ecological and Socio-Economic Implications

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2014

ABSTRACT

Plant invasion is a major threat to forest ecosystems. It causes major loss to biodiversity and ecosystem services in addition to its economic and social implications. However, alien invasive plants are not completely negative ecologically and socio-economically. A suite of environmental factors cause alien invasive plants to become abundant and persistent. Among such factors are disturbances to the canopy and several edaphic factors that create favourable environment for alien plants. This study was designed to assess the effects of *Broussonetia papyri/era* invasion on the composition and structure of the Afram Headwaters Forest Reserve (AHFR), and its socio-economic implications for the local community. The study involved floristic and soil sampling of 30 (25 x 25 m) plots in three habitat types representing varying degrees of canopy disturbance (slightly disturbed, heavily disturbed and abandoned farms) and social surveys. The study was conducted between November 2013 and April 2014. The results indicate that disturbance~ create gaps that favour the spread and establishment of *B. papyri/era* in the reserve. These results suggest considerable negative effects of human-induced disturbances and *B. papyri/era* invasion on the diversity and structure of the AHFR. Non-metric multidimensional scaling ordination of species density indicated the abandoned farm habitat was quite different from the heavily disturbed and slightly disturbed habitats. Species richness, mean Shannon Diversity Index (H), mean Shannon Evenness (E) and mean Simpson's Index of Diversity ($1 - D$) were higher for the slightly disturbed habitat compared to the heavily disturbed

and abandoned farm habitats. Tree species diversity was highest for the heavily disturbed habitat. However, mean diameter and mean basal area of trees were highest for the abandoned farm habitat. There was low number of significant correlations between soil physicochemical parameters and plant diversity indices, indicating that soil physicochemical properties did not strongly influence plant invasion in the AHFR. However, pH, exchangeable K, water holding capacity and soil organic carbon had positive correlations with plant invasion. Analysis of the social survey indicates that even though *B. papyrifera* impacts negatively ecologically and socio-economically on the community, it is not completely harmful. However, there are uncertainties about *B. papyri/era* effects on fire regimes.

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