

**PLANT-BIRD INTERACTIONS WITH SPECIAL REFERENCE  
TO IDENTIFICATION OF BIRD-ATTRACTING PLANTS FOR  
AFFORESTATION OF ATTAPPADY VALLEY, KERALA**

**Principal Investigator : Dr.P.Balasubramanian**

**Co-investigator : Mr.P.Radhakrishnan**

**Junior Research Fellow : Ms. R.Aruna**



**Salim Ali Centre for Ornithology and Natural History, Coimbatore**

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## SUMMARY

Attappady (10° 55' 10" and 11° 14' 19" North latitude and 76° 27' 11" and 76° 48' 8" East longitude) in southern Western Ghats is one of the important tribal tracts of Kerala. It is one of the two extensive east sloping plateaus in the Western Ghats, which stretches from Mukkali to Anaikatty and Thazhemully to Muthikulam over an area of 745 sq. km. Attappady Hills Area Development Society (AHADS) has launched various eco-restoration programmes to restore the degraded areas of Attappady. One such program was watershed development, a part of which include tree planting. A total of 30 species comprising mainly exotics have been planted by AHADS. Realizing the need for planting trees that attract wildlife, particularly frugivorous birds and mammals, AHADS sanctioned a project to Salim Ali Centre for Ornithology and Natural History to identify the bird-attracting species. Major objectives of the project were, i. Document avian frugivory and find out bird-dispersed plants; ii. suggest native bird-attracting plant species for afforestation of degraded habitats in Attappady.

Study sites were selected in Agali, Palliara, Kottathara, and Pattimalam, which is primarily the dry belt, once predominated by scrub and mixed dry deciduous vegetation. A total of 10 sites comprising five each in AHADS plantation (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> year), and five AHADS's biomass sites (1<sup>st</sup>-5<sup>th</sup> year). In addition to these, three sites were selected in the adjoining Anaikatty Reserve Forest as control site, where the climax community, the southern dry mixed deciduous forest occurs. As this area is relatively less disturbed, a complete picture of vegetation composition, bird community structure could be obtained and compared with the Attappady sites.

Bird population was assessed by fixed width line transect census method. Thirteen permanent transects were laid in the study area. Avian frugivory was documented by recording the activities of birds foraging on fruit-bearing plants. Two methods were followed; in the first method, birds foraging on fruit-bearing plants were recorded while walking along the census transects. The number of birds in a foraging flock and the fruit

species eaten birds were noted. Most of the observations were done within four hours after sunrise, which is the most active foraging time for birds. In the second method, extended watches were carried out in focal fruit bearing trees to record frugivore visitation and fruit handling methods. Plants selected for observation had drupes, berries or similar soft fruits having one or a few seeds or with composite fruits with many small seeds (Moraceae). Observations were made between 6.00 and 9.00 am on the bird visitation to fruit-yielding plants, with the help of a pair of binoculars. The visit by each individual bird followed by pecking/swallowing of fruits was considered as a fruit-feeding visit. To assess the flowering and fruiting periodicity of plants, 150 individuals of woody plants belonging to 30 species (24 tree species and 6 shrubs) were tagged and the data was gathered twice in a month for 12 months. Quantification of vegetation was done in plantation, biomass and undisturbed forest. Quadrats of 10 x 10 m were laid along select transects in each of the above study sites. Plants measuring >20 cm GBH were recorded and considered as woody species. Vegetation data was gathered by laying 50 quadrats in undisturbed dry mixed deciduous forests, 25 in plantation and 25 in biomass sites.

The vegetation analysis in the undisturbed forests of Anaikatty shows the occurrence of 54 woody plant species in the dry mixed forest. The density values show that *Pleiospermium alatum* belonging to Rutaceae, dominates the forest and it is followed by *Cordia monoica* and *Albizia amara*. Important bird-attracting plants recorded here are *Canthium dicoccum*, *Cassine glauca*, *Celtis philippensis*, *Cordia monoica*, *Diospyros montana*, *Ehretia laevis*, *Ficus benghalensis*, *Ficus mollis*, *Flacourtia indica*, *Maba buxifolia*, *Pleurostyliia opposita*, *Premna tomentosa*, *Benkara malabarica*, *Santalum album*, *Strychnos potatorum*, *Ziziphus mauritiana* and *Ziziphus oenoplia*. In the biomass sites, 62 woody species were enumerated of which 20 were represented by saplings/seedlings only. Most dense woody species here are *Tectona grandis*, *Santalum album* and *Bambusa arundinacea*. Dominant saplings and seedlings in the biomass sites include *Bambusa arundinacea*, *Glycosmis pentaphylla* and *Premna tomentosa*. In the plantation sites, 42 species were enumerated out of which 17 were represented by adult trees and the remaining by seedlings and saplings. The densest species here are *Albizia*

*amara*, *Mundulia sericea* and *Acacia nilotica*. Forty species of seedling and saplings were recorded in the plantation sites. The dominant sapling/seedling are *Mundulia sericea*, *Tarenna asiatica* and *Azadirachta indica*.

Certain bird-attracting species are represented by seedlings/saplings alone. For example, presence of *Muntingia calabura* and *Murraya koenigii* saplings in the biomass sites and *Murraya paniculata* in the plantations indicate that these species are likely to be introduced here by birds.

The phenological study shows the occurrence of seasonality. The number of species in ripe fruits showed a peak (n=23) during the southwest monsoon and a dip in the post-monsoon (n=9). During summer and northeast monsoon, 17, 13 species had fruits. Month-wise fluctuation of fruiting was also observed. Highest number of species (n=10) were recorded in fruiting during June and July, the lowest (n=3) in December. As far as the number of individuals is concerned, peak activity (n=82) was observed in July 2007, a dip in April (n= 23).

A total of 108 species of birds belonging to 36 orders were recorded from the study area. Of these, 47 % were insectivores, followed by frugivores (14%), omnivores (14%) and others. Transects in the undisturbed forests of Anaikatty harbored the maximum number of bird species (n=101). In Attappady, biomass sites recorded higher number of bird species (n=95) than the plantation (n=86). Species diversity of birds was also found to be highest in the undisturbed forests.

Extended watches were made on 32 fleshy-fruited plant species for a period of 1086 hrs. Twenty nine frugivorous bird species of 13 orders were observed to visit these plant species. Among the frugivore visitors, bulbuls (5 species) made highest number of feeding visits (45%), followed by mynas, 2 species (16%), babblers, 3 species (14.5%) and others that include barbets, koel, etc. Among the bird species, Red-vented Bulbul (15.10%), followed by Red-whiskered Bulbul (14.50%), White-browed Bulbul (14.30%), Common Myna (14.10%) and White-headed Babbler (11.20%) were recorded as the most frequent frugivore visitors. During the transect walk observations 40 fleshy-fruited

species were recorded to be eaten by birds. Maximum sightings were had on *Lantana camara* (23%) an exotic weed. Altogether, 48 bird-attracting species of 20 families were recorded in the study area. Moraceae represented by eight species was found to be the most dominant bird-attracting family followed by Rutaceae (n=6), Euphorbiaceae (n=5) and Boraginaceae (n=4). Among the 48 species, *Ficus benghalensis* attracted maximum number of avian frugivores (n=21) followed by *Ficus microcarpa*, *Benkara malabarica*, *Cassine glauca* (n=17 each) and *Canthium dicoccum* (n=15). Other important bird-attracting species include *Santalum album*, *Premna tomentosa*, *Celtis philippensis* and *Streblus asper*.

Fifty three indigenous species comprising 33 fleshy-fruited species, 6 nectar yielding and 14 perch trees are suggested for planting in the dry degraded tract of Attappady. Descriptions of these species are provided with details such as botanical name, local name, flowering, fruiting period, economic importance etc. The occurrence of 67 species of birds, 40 species saplings/seedlings (woody plants) in the plantation sites indicate that AHADS's restoration efforts have yielded desirable results. Planting bird-attracting plants would further enhance the avian biodiversity and hence AHADS may include the above-mentioned bird-attracting species in their planting programme.