Chapter Four

Habitat Associations of Birds and Small Mammals Along a Gradient of Forest Use

Abstract

I study the habitat associations of animal species and species assemblages (51 bird and 8 small mammal species) along a disturbance gradient at Chitre Village, northeastern Nepal, in order to establish baseline quantitative knowledge of species-habitat associations for the Temperate Sikkim-East Nepal Himalaya, and to better understand how local forest use practices impact the composition and structure of regional wildlife habitats. I use cluster analysis, based on mean habitat values at occupied sites, to identify three species associations: a closed-canopy assemblage, disturbed forest assemblage, and village environments assemblage. Within these assemblages, I identify species that are closely associated, or not, with the characteristic compositional and structural features of three progressively-disturbed habitat zones (closed-canopy forest, disturbed forest, and village environments). I also identify species that are closely associated with features of the forest canopy, understory, and anthropogenic disturbance. Species and species assemblages were best distinguished in multivariate habitat space by an ordination axis consisting of disturbance variables. Secondary ordination axes consisted of variables related to the density of woody plants. Finally, I use territorial spot-mapping and binary logistic regression to develop habitat models for seven understory passerine species. Model parameters that best distinguish between occupied and unoccupied sites for these species were related to abundance of late-successional and pioneer plant species, height and density of large trees, abundance of mesic and xeric understory plant species, and anthropogenic disturbance. Few previous studies have used comparable methodological rigor to study the ecology of small Himalayan birds or mammals,

and none has employed a Design II habitat study, which assesses habitats and breeding densities of known individuals.

Introduction

In this chapter, I investigate the habitat associations of selected terrestrial vertebrates in an anthropogenically-influenced temperate mixed broadleaved forest at Chitre Village, northeast Nepal. I investigate passerine birds and small terrestrial mammals because these taxa are relatively easy to detect, are known to be good indicators of environmental change (Svensson 1970, Stoddart 1979, Steele et al. 1984), and show strong associations with the structure and composition of vegetation (Hildén 1965, James 1971, Wiens and Rotenberry 1981a, Morrison et al. 1992, Block and Brennan 1993). I do not investigate large raptorial birds or mid- and large-sized mammals because, with the exception of muntjac (*Muntiacus muntjak*), they are rare in the study area. Home ranges of these species cover large areas, encompassing multiple villages, so they should be studied at larger geographic scales than I was logistically able to cover. Many of the animal taxa I investigate are characteristic of temperate broadleaved forests throughout the Eastern Himalaya Region. I emphasize species that occupy the forest understory because understory passerines are known to be sensitive to anthropogenic disturbances to the understory of forest ecosystems (Willson et al. 1994, Sieving et al. 1996, Restrepo and Gomez 1998). Furthermore, the abundance of territorial understory birds can be reliably estimated (Ralph and Scott 1981), and their well-defined breeding territories provide excellent locations to measure habitat features where they are of greatest importance for reproductive success.

I use the avian nomenclature and taxonomy of Grimmett et al. (1998), mammalian nomenclature of Corbet and Hill (1992), and botanical nomenclature of Grierson and Long (1983). Synonymous and scientific names are provided in Appendixes 1.2 for plants, 1.3 for birds, and 1.4 for mammals. The conservation status of the regional flora and fauna is discussed in Chapter 1.

Whereas a great many studies have investigated the structure of bird and small mammal communities over the past half-century, quantitative studies of animal communities have only begun relatively recently on the Indian subcontinent. Most have sought to correlate the occurrence of bird species or avian guilds with broad vegetation types at the landscape or macrohabitat scale (e.g., Daniels et al. 1990, Khan et al. 1993, Javed 1996, Shafiq et al. 1997, Baral 2001, Raman 2001, Raman and Sukumar 2002). Such "correlative" approaches often provide limited or imprecise descriptions of species' habitats, whereas the "focal animal" approach I take in this study provides more explicit descriptions of habitats (Morrison et al. 1987, Block and Brennan 1993). In contrast to earlier studies, I focus not on testing established principles of community ecology in a novel landscape, but on applying these concepts to identify and assess specific habitat predictor variables for individual species, with an emphasis on variables that are linked to specific forest use practices. My objectives necessitated methods of data collection and analysis that are uncommonly rigorous among habitat studies conducted in the Himalaya Region.

The objective of this chapter is to characterize and model the habitat associations of selected animal species and species assemblages along an anthropogenic disturbance gradient in a Temperate Sikkim-East Nepal Forest (TSENF). The study of wildlife habitat associations is fundamental to wildlife conservation and management because the growth, decline, and geographic extent of wildlife populations is predicated upon providing suitable environmental conditions (Leopold 1933, Wiens and Rotenberry 1981b, Block and Brennan 1993, McDonald et al. 2005). Knowledge of the habitat associations of species assemblages allows for efficient regional-scale monitoring of the effects of anthropogenic disturbance on the environment

(Canterbury et al. 2000). Habitat associations of species can differ somewhat over time and space however (Wiens 1989a, 1989b), so extrapolation or comparison of the findings of a particular study, such as the present one, requires appropriate caution.

Initially, I explore species-habitat associations by ordinating animal species in multivariate habitat space. I then assess covariation of species abundances with individual habitat variables, and test for differences in means of habitat variables at sites classified as either occupied or unoccupied by individual species. Finally, for a select group of understory passerines, I explore regression models to assess the relative importance of habitat predictor variables for predicting the probability of habitat occupancy by a given species. The findings of this chapter further the quantitative knowledge of habitat associations of 59 animal species of the temperate eastern Himalaya. In the following chapter (Chapter 5), I investigate how anthropogenic influences affect the biotic communities to which these species belong.

Methods

Study Area

Physical features of the study area are described in Chapter 1, and woody plant associations are described in Chapter 3. Based on the findings of Chapter 3, I recognize three concentric, regressively-degraded habitat zones around Chitre Village: Village Environment, Disturbed Forest, and Closed-canopy Forest. Concentric zones of disturbed habitat commonly occur around remote villages (Wagner 1960, Moench and Bandyopadhyay 1986). These zones are not internally homogeneous however, because habitat patches characteristic of one zone also occur in lesser quantities in other zones. Here, I describe these zones in mostly qualitative terms. In Chapter 5, I analyze their composition and structure in detail.

Village Environment

The Village Environment (VE) extends from the center of the village to ~300 m distance, where vegetation consists primarily of clearings (69-83% frequency, Fig. 3.4) and lesser amounts of oak/laurel and rhododendron associations (8-28% and 3-8% frequency, respectively, Fig. 3.4). At village center, there are croplands and a variety of houses, livestock sheds, stone walls, hedgerows, and small kitchen gardens (Fig. 4.1). Most woody plants near dwellings and cultivated fields are planted and maintained as hedgerows or fodder trees (Chapter 3). Just beyond the dwellings and cultivated fields lie shrubby swiddens (Fig. 1.8) and pastures (Fig. 4.2), interconnected by a network of footpaths. Abundant woody plant species include *Berberis aristata*, *Eurya acuminata*, *Lyonia ovalifolia*, *Symplocos theifolia*, and *Viburnum erubescens.* Prior to settlement, the forest where the village now stands was similar to present-day forest 600-800 m from village center, with regard to species composition of trees >50 cm diameter as base (Chapter 3).

Disturbed Forest

Disturbed Forest (DF) habitats extend ~300-650 m from village center, and consists of a patchwork of vegetation associations (50-60% oak/laurel, 12-21% rhododendron, 12-19% clearings, 1-16% mixed broadleaved, Fig. 3.4), with high vertical and horizontal heterogeneity. Canopy heterogeneity is highest near footpaths, forest-interior pastures (*khArka*), and fuelwood- and timber-harvesting sites. Shrub cover and shrub-edge diversity are relatively high.

Areas of DF with southerly exposure are more xeric (Fig. 4.3), have lower tree canopy cover and tree basal area, and an abundance of light- and disturbance-tolerant tree species (e.g., *Lyonia ovalifolia* and *Rhododendron arboreum*). Forest edges with southerly exposure are softened by a band of pioneering *Lyonia ovalifolia* and *Eurya acuminata*. Areas of DF with northerly exposure, or located within ravines or on west-facing slopes, are more mesic (Fig. 4.4). The tree canopy is taller and denser, and tree basal area is higher. Mosses, ferns, oaks, and laurels are relatively abundant. Forest edges in mesic DF are harder (more distinct) than at xeric sites, and more dominated by *Symplocos theifolia.* Forest gaps at mesic sites are often colonized by *Hydrangea heteromalla*.

Closed-canopy Forest

Closed-canopy Forest (CF) habitats (Fig. 4.5) extend beyond ~650 m from village center. Vegetation consists primarily of mixed broadleaved and oak/laurel associations (16-81% and 18-60%, respectively; Fig. 3.4), with lesser amounts of rhododendron (1-12%) and clearings associations (0-12%). The tree canopy is dense, and averages about 20 m in height. Late-successional species are frequent (e.g., *Ficus neriifolia, Lindera pulcherrima, Litsea elongata, Michelia kisopa, Persea clarkeana*, *Quercus oxyodon*, *Schefflera impressa*), and large individuals exceeded 100 cm DBH (diameter at breast height). The understory is relatively open, with abundant bamboos, ferns, moss, and leaf litter.

Data Collection

I used a sampling protocol designated as SP-D by McDonald et al. (2005), in which available habitats are randomly sampled and then classified as either occupied or unoccupied based on species detections. Sampling points were distributed at the population level rather than linked to specific individuals (Manly et al. 2002). "Unoccupied" does not infer never used, only that the species was not detected at a site after repeated visits. I assume detection probability was a function of site suitability for a given species. I incorporated two types of study design, Thomas and Taylor's (1990) Designs I and II. I used Design I to assess habitat associations of abundant bird species at the population level. Data were collected along line transects (Burnham et al.

1980), but no attempt was made to estimate densities or to identify or track birds as individuals. I used Design II to assess the habitat associations and breeding densities of known individuals of selected species of understory passerines and small mammals. So far as I can ascertain, this is the first Design II habitat study ever conducted on small Himalayan birds or mammals.

I collected species occurrence and habitat data at ten 9-ha (300 m x 300 m) plots located along a distance/disturbance gradient extending from the mean location of village residences to an area too distant (~2 km) and too rugged for normal use by resident people or livestock (Fig. 2.5). I used 9-ha plots because areas of at least 9 ha were required to encompass several contiguous breeding territories of passerine bird species (Engstrom 1981) and because square 9-ha plots were easily subdivided into smaller equal-sized parcels. All ten plots were established between 2200-2600 m elevation. Eight were located along a major footpath (*Namche-jAne bhAto*; Fig. 2.5), where the predominant aspect was southwest. The remaining two were located several hundred meters from this trail on predominantly northeast slopes, one (Bhelli) at a forest-interior pasture, and the other (Chakedho) at a remote control site where overland access was extremely limited.

In 1993, I conducted general faunal surveys and bird spot-mapping on seven 9-ha plots, two in Village Environments (Chitre Bari and Chitre Kharka), two in Disturbed Forest (Upper Chaite and Hile), and three in Closed-canopy Forest (Bagalekhop, Tauke, and Bhelli). I also attempted to sample mid-sized mammals (see Appendix 1.4 for a list of all mammal species detected) by monitoring 1-m^2 tracking beds (Conner et al. 1983), but the beds became impossible to maintain during the monsoon season, so I abandoned systematic sampling for mid-sized mammals. In 1994, I conducted spot-mapping of understory birds at five plots, three new plots (Lower Chaite in DF, and Alu Bari and Chakedho in CF), and two plots previously sampled in 1993 (Chitre Kharka and Hile). I spot-mapped understory birds at Chitre Kharka and Hile both years, to confirm that between-year variation did not preclude pooling of 1993 and 1994 spot-map data. In total, I conducted general faunal surveys at seven plots and passerine spot-mapping at ten plots.

Within each 9-ha plot, I established six parallel trails 50 m apart (1800 m of trail per plot), with sampling points at 50 m intervals, resulting in 36 evenly-spaced sampling points in each 9-ha plot (Fig. 3.1). I collected all animal, plant, and habitat data at, or in reference to, these sampling points (see below).

General faunal surveys

I counted diurnal birds along the six trails in each 9-ha plot. Beginning at dawn, I walked slowly and quietly along each trail, recording all birds distinguishable by sight or sound. I noted the nearest sampling station where each individual was detected, as well as its behavior, height above the ground, and group size. I omitted records that might have been re-counts of the same individual. Potential recounts were rare, however, because most birds either remained near their territories or were associated with large mixed-species flocks that I recognized when I re-encountered them on a parallel trail. I surveyed each 9-ha plot six times (five at Bhelli) between the third week of April and the third week of June, 1993. I alternated the direction of travel on successive counts to reduce time-of-day bias.

I did not employ distance sampling to estimate population densities (Buckland et al. 2001) because the objective of general faunal surveys was simply to determine the presence of species at sampling sites. In dense forest, distance sampling is too error-prone to use to estimate population densities of birds (Ralph and Scott 1981, Buckland et al. 2001).

I assessed the abundance of small mammal species by trapping continuously for six nights in each 9-ha plot, between 10 May and 11 July, 1993. I placed one pitfall and one small box trap near each of the 36 sampling points in a 9-ha plot. Pitfall traps were constructed from 1.5-liter plastic beverage pitchers with holes drilled 10 cm from the base to maintain a constant level of rainwater. Box traps were Sherman-style traps measuring 7 cm x 7 cm x 25 cm and baited with pork fat (peanut butter, strawberry jam, and a poultice of dry-roasted corn and wheat proved to be ineffective baits).

I checked pitfall and box traps each morning and evening, and recorded the weight, total length, tail length, sex and reproductive status of all animals captured. I marked live-trapped animals by toe-clipping (Baumgartner 1940), to distinguish first-time captures from subsequent recaptures. The ten 9-ha study plots were trapped in succession rather than simultaneously due to material and manpower limitations.

Whenever possible, I identified small mammals by non-destructive means, due to Buddhist cultural sensitivities. At the onset of the study, I sacrificed a few individuals of each species and identified them according to body weight, pelage, tail-to-body ratio, skull dimensions, and dentition, following the criteria of Mitchell (1977) and Corbet and Hill (1992). Thereafter, I identified small mammals on the basis of gross morphology, weight, and tail-to-body ratios. Species likely to occur in the area were generally dissimilar with respect to body dimensions, so misidentifications, if any, would have been too few to adversely bias my analysis of species' habitat associations. Commensal species of *Rattus* were particularly difficult to distinguish, so a small number ($\leq$5%) identified as *Rattus rattus brunneusculus* might have been *R. turkestanicus, R. nitidus*, or *R. remotus* (Mitchell 1977). I did not attempt to distinguish between commensal and feral forms of house mouse (*Mus musculus*).

Passerine spot-mapping

I used territorial spot-mapping (Williams 1936, Kendeigh 1944, Svensson 1979, Bibby et al. 1992b) to determine the perimeters of individual breeding territories of seven understory passerine species (white-browed shortwing *Brachypteryx montana*, Indian blue robin *Luscinia brunnea*, scaly-breasted wren babbler *Pnoepyga albiventer*, pygmy wren babbler *Pnoepyga pusilla*, grey bushchat *Saxicola ferrea*, chestnut-headed tesia *Tesia castaneocoronata*, and grey-bellied tesia *Tesia cyaniventer*). These species were selected because they were relatively abundant and foraged and nested on or near the ground.

The primary purpose of spot-mapping was to determine the perimeters of individual breeding territories for subsequent microhabitat analysis. I do not use general survey detection locations to analyze microhabitats because they often do not accurately reflect the micro-scale resources necessary for successful reproduction (Van Horne 1983, Wiens 1989a); general survey detections could have been of non-breeding individuals or of individuals using a site for non-reproductive purposes.

I began spot-mapping at dawn and completed a single 9-ha plot in ~2.5 hrs. When I detected an individual either by sight or by sound, I recorded its location on a study area sketch map. I also recorded, when applicable, the sex of individuals, the type of vocalization, whether a conspecific was counter-singing nearby, the direction of the bird's subsequent movements, whether the bird was carrying nesting material or food, and whether the bird was at a nest or with a fledgling. I spot-mapped each plot on five occasions between the last week of April and the first week of June. After completing five systematic spot-mapping sessions at each plot, I returned wherever necessary to clarify unresolved territorial boundaries by observing bird movements and listening for counter-singing males. Five systematic spot-mapping visits was a bare minimum (Kendeigh 1944, Svensson 1979, Bibby et al. 1992b), but I consider it adequate for a study limited to seven abundant species when uncertain boundaries were resolved by subsequent intensive observation.

Habitat variables

I used point-centered-quarter (Cottam and Curtis 1956), line intercept (Canfield 1941), and fixed-area plot (Noon 1981, Cooperrider et al. 1986) techniques to sample habitat variables at the 36 sampling points in each 9-ha plot (Fig. 3.1). Potential habitat predictor variables were identified from the literature on other temperate forest species and anecdotal field observations. Descriptions and codes for these variables are provided in Appendix 4.1.

I measured twelve trees at each sampling point using a 3-level point-centered-quarter technique as described in Chapter 3. I assessed cover values of shrubby understory plants by measuring cover intercept along two 10-m measuring tapes, one extended along a topographic contour 10 m above each sampling point and another similarly positioned 10 m below the sampling point. Rather than record all species of shrubby understory plants, I designated them as bamboos (all species), shrubs (woody plants <1.5 m height and <2 cm DAB), or large ferns (≥30 cm height, e.g., *Dryopteris* spp.).

I recorded tree stumps and habitat edges within four contiguous 50 m x 50 m (0.25-ha) subplots centered at each sampling point (Fig. 3.1). Tree stumps were counted by visually searching each subplot, and habitat edge (horizontal patchiness) was assessed by applying Schuerholz's (1974) "shrub-edge diversity index" to a sketch map of each plot (Fig. 4.6). At sites where small mammal trapping was conducted, I ranked the relative abundance (0-3) of leaf litter, herbaceous plants, and mosses (Bryophyta) within 2 m of the traps. These data are used only for analysis of small mammal habitats because the reference area is too small to influence habitat selection by birds.

Data Analysis

All analyses are performed with the computer program STATISTICA (StatSoft, Inc., Tulsa, OK). I use nonparametric tests where applicable because sample sizes were frequently small and habitat variables were frequently not normally distributed. Statistical associations between animal responses and habitat variables do not necessarily infer causal relationships (Wiens and Rotenberry 1981b). Furthermore, although vegetation and topography are the usual predictor variables measured for habitat studies, they may merely be correlated with more fundamental and difficult-to-measure variables that influence habitat use more directly, such as food resources or microclimates (Cody 1981). Some individuals were probably detected in habitats that were actually marginal or unsuitable for the species, but I assume this occurred too rarely to adversely influence my analyses. I also assume habitat selection was similar among individuals of different sex and age during the survey period (May-July).

I analyze habitat associations of bird species and small mammal species that were detected $\geq$4 times during general faunal surveys (51 bird species and 8 small mammal species). I exclude bird taxa that are difficult to detect or identify reliably, or are difficult to associate with sampling points because they range over large areas. These include nocturnal species, swallows, swifts, birds of prey, most *Phylloscopus* warblers, most *Carpodacus* rosefinches, passage migrants, birds flying high overhead, and species encountered <4 times during systematic surveys. Detection data for excluded species are provided in Appendixes 1.3 and 1.4.

Rather than analyze raw census counts, I analyze an index of abundance based on the number of sampling points where a species was detected one or more times during general faunal surveys. Such an index is preferable for habitat analysis because raw counts are biased by group detections and variation in detectability.

I evaluate species-habitat associations at both macrohabitat and microhabitat scales because animals are known to select and respond to different resources at different spacial scales (Wiens et al. 1987, Wiens 1989b). *Macrohabitat* is defined by Morris (1987) as "distinguishable habitat units whose minimum area corresponds to that within which an average individual performs all of its biological functions during a typical activity cycle." It corresponds to Johnson's (1980) second order of resource selection, or what is commonly known as an individual's home range. In practice, where home ranges have not been assessed, macrohabitat is often equated to homogeneous units of vegetation otherwise recognized as patches or stands (e.g., Saab 1999). Here, I treat the three progressively-degraded vegetation zones around Chitre Village as different macrohabitats.

Morris (1987) defines *microhabitat* as fine-grain "patches of environmental variables that influence an individual's allocation of time and energy within its home range." It corresponds to Johnson's (1980) third order of resource selection. Among terrestrial vertebrates, microhabitat often corresponds to the space associated with song perches, nests, dens, roosts, or foraging sites. For practical purposes, vertebrate microhabitat is often equated to the area of a vegetation plot ($\leq$1 ha).

Univariate habitat analysis

I analyze micro-scale univariate associations by testing for differences in mean habitat values at occupied versus unoccupied sampling sites, using Mann-Whitney *U* tests (with continuity correction for small sample size, Zar 1996). For bird species, occupied habitats include all sampling points where at least one individual was detected during general faunal surveys; for small mammals, all sampling points where at least one individual was trapped. For microhabitat analysis, I use data from all seven plots where general faunal surveys were conducted, in order to maximize the sample of occupied sites.

With regard to species-habitat associations, a lack of statistical significance does not necessarily confer a lack of association, because means comparisons are highly influenced by sample size. Even when two means differ widely, as variance around the means increases, additional samples are required to detect a significant difference. Consequently, species that are detected at relatively few sampling sites will have statistically-significant associations with fewer habitat variables. Similarly, when mean values for habitat variables at occupied sites approach mean values at unoccupied sites, additional samples are required to detect a significant difference.

I analyze macro-scale univariate habitat associations by testing for correlation (Pearson *r*, Zar 1996) between zonal means of habitat variables and species abundance indexes. In each zone, I analyze the two plots where general surveys were conducted. I omit a third CF plot, Bagalekhop, in order to balance sampling effort across zones (Bagalekhop was more similar to DF plots than the other CF plots). I also omit the sixth survey repetition, where conducted, to maintain a balanced sampling effort across plots (only five repetitions were conducted at Bhelli).

All univariate analyses are performed with raw (untransformed) data, the null hypothesis is no difference in means of habitat variables in occupied and unoccupied sites (that species did not selectively occupy habitats where particular habitat variables are high or low), and the hypothesis tests are considered significant at $P \leq 0.05$.

I use the results of univariate habitat analysis to partition animal species into three assemblages - closed-canopy species, disturbed forest species, and village environment species - based on the frequency and strength of associations with habitat features that are characteristic of those environments.

Multivariate habitat analysis

I use cluster analysis, with Ward's amalgamation method and Euclidian distance, to parse animal species into "ecological assemblages," groups of species which share similar habitat requirements (habitat values at occupied sites). Creation of a small number of assemblages permits group-wise analysis and streamlines the interpretation of a large number of species-habitat associations.

I use principle components analysis (PCA) to ordinate animal species in multivariate habitat space generated from mean values of habitat variables at occupied sites (Rotenberry and Wiens 1980). PCA reduces the number of habitat variables to a minimum number of composite factors that best explain variation among the original variables. I maximize explained variance by reducing the number of initial input variables, following elimination criteria suggested by Afifi et al. (2004). I did not rotate PCA axes because rotation did not improve interpretation. I log transformed ($\ln(x + 0.5)$) many habitat variables to improve normality, and I standardized all variables prior to PCA analysis. I converted variables with many zero values or skewness >2.0 to categorical (presence-absence) variables, or omitted them from analyses.

I use binary logistic regression (maximum likelihood estimates) with a logit (log-odds) link function (Hosmer and Lemeshow 2000, Manly et al. 2002) to assess habitat predictor variables for selected understory bird species. Logistic regression allows for multiple continuous and categorical predictor variables (McDonald et al. 2005), and is not constrained by the assumption of multivariate normality (Afifi et al. 2004). I use regression analysis for descriptive or exploratory purposes, as opposed to confirmatory purposes (Morrison et al. 1992), because too little information existed on micro-scale habitat associations of the species concerned to confidently state and test *a priori* hypotheses.

I limit logistic regression analysis to seven bird species for which breeding territories (sampling locations) were determined by spot-mapping, because spot-mapping provides more definitive habitat data than general faunal surveys (see Passerine spot-mapping under Data Collection above). Spot-mapping also provides location data for "known" individuals, as required for Design II habitat studies (Thomas and Taylor 1990). I use data from all seven 9-ha plots because, unlike some other analyses I perform, zone-wise comparisons are not made, so balanced sampling across the three habitat zones was not required. Balanced representation of occupied and unoccupied sites was required for logistic regression however (Manly et al. 2002), so rather than compare, for example, three occupied sites against 249 unoccupied sites across all seven 9-ha plots, I compared occupied sites only to unoccupied sites within 9-ha plots where at least one male of a given species held a territory. The distinction between occupied and unoccupied habitat therefore differs between the regression analyses I perform and the univariate means tests described above. For univariate means tests, the comparison is between occupied sites and unoccupied sites across the entire ~2 km distance/disturbance gradient, whereas with logistic regression the comparison is between occupied sites and unoccupied sites within ~200 m. The tradeoff for limiting the number of unoccupied sites for regression analysis is decreased classification rates; it is more difficult to distinguish between sites that are spatially close. Because my aim was to assess the relative importance of predictor variables rather than build single best models, I conceded to the decreased rates of classification.

I reduced the number of potential predictor variables for regression analysis by omitting variables that were not highly correlated with occupancy (r <0.75) or did not differ between occupied and unoccupied sites in univariate means tests (Mann-Whitney U, $P \leq 0.10$). If any of the remaining variables were highly correlated with another (r >0.75), I used the one that was most biologically meaningful, best linked to forest use, or most practical to measure in the field. I dichotomized variables that were overly skewed by zero tallies (skewness $\geq$2.5) to 0-1 categorical variables.

I use best subsets logistic regression (Afifi et al. 2004), inputting $\leq$15 habitat variables that performed well under the variable reduction procedures described above. I do not attempt to build single best models because there were frequently too few samples of occupied habitat to attempt to develop definitive models, and because subsets of models are more useful for exploratory purposes. For each species, I tested both raw and transformed data for each variable, and used the version that best fit the logit link function for a given species according to Afifi et al.'s (2004) Deviance/*df* ratio. I assessed the four highest-ranking models containing no more than the recommended maximum number of parameters (K+1 < n/10, where K is the number of parameters and n is the number of occupied sites, Hosmer and Lemeshow 2000). I tested for parameter interaction by temporarily including interaction terms (e.g., A x B) for all pairs of model parameters and observing whether the coefficient of the interaction term was significant (Afifi et al. 2004). I did not attempt to validate models (again, because my objectives are exploratory and sample sizes are frequently small).

I evaluate model "best-ness" (Guthery and Bingham 2007) of the highest-ranking models using Akaike's Information Criterion, ΔAIC_c (corrected for small sample size), and log likelihood odds ratios. AIC is an information-theoretic criterion for identifying an optimal and most parsimonious (simplest) regression model, and ΔAIC is a measure of the degree to which AIC values of competing models deviate from the model with the best (lowest) AIC. Competing models with $\Delta AIC \leq 2$ are considered to be well supported by the data (Burnham and Anderson 2002). Log-likelihoods are odds ratios scaled to the logarithmic function that links modeled data to the response variable. I use chi-square tests of log-likelihood statistics to estimate how well a given model predicts sampling site use.

Finally, I used the Wald statistic to assess relative importance of the habitat variables identified by best subsets regression (Afifi et al. 2004). The Wald statistic measures the degree to which a given variable increases the slope of the regression over a model containing just the intercept term. The sign of the parameter estimate (+/-) indicates whether the species has a positive or negative association with the variable.

Results

Univariate habitat associations

Mean values for habitat variables, within habitat zones and throughout the study area, are given in Appendix 4.2. Mean values for occupied sampling sites are given in Appendix 4.3 for birds and Appendix 4.4 for small mammals. Habitat variables that have significantly higher or lower values at occupied versus unoccupied sites are listed in Tables 4.1 and 4.2.

Among species of the VE assemblage (see cluster analysis results below), a relatively small sample of occupied sites was sufficient to detect associations with multiple habitat variables (Fig. 4.7), largely because village environments differ strikingly from the rest of the study area. A relatively large sample of occupied sites was necessary to detect habitat associations among DF assemblage species (Fig. 4.7), because many occupied sites in DF approached "average" conditions for the entire study area. Apparently, many DF species prefer "average" habitat conditions. CF and VE assemblages included disproportionate numbers of species detected at only a few locations (Fig. 4.7). Among CF species, these are frequently habitat specialists; among VE species, they are often habitat generalist restricted to highly-disturbed habitats near the village center (see Chapter 5).

Among CF animal species, 30% (6/20) are positively associated with the frequency of late-successional laurel (Lauraceae) or oak (Fagaceae) trees, which are late-successional, and 10% (2/20) are negatively associated with frequency of heather species (Ericaceae), which are early-successional species or minor subcanopy components. Four species (20%) are positively associated with tea (Theaceae) species, which are also early-successional species or minor subcanopy components (Tables 4.1.1 and 4.2). Forty percent of DF animal species (8/20) are positively associated with Theaceae, and only 15% (3/20) with Lauraceae. Ten percent of DF species (2/20) are negatively associated with Fagaceae, and 15% are negatively associated with Ericaceae (Tables 4.1.2 and 4.2). Among VE animal species, 12-29% are negatively associated with Fagaceae, Lauraceae, and Theaceae, and 6-12% are positively associated with Ericaceae or Theaceae.

With regard to the basal area of the preferential woody plant species (Chapter 3, Table 3.2), CF animal species are most frequently associated with species of the mixed broadleaved vegetation association (especially ACECAM, ILESIK, LITELO, MELPIN, PERCLA, and QUEOXY; Tables 4.1.1. and 4.2). Exceptions include negative associations of one CF species with ACECAM and ILESIK, two with FICNER, and positive associations of six CF species with SYMTHE (a ubiquitous species), four with QUELAM, two with HYDHET, one with RHOARB, and one with BERARI.

DF animal species are primarily associated with the basal area of oak/laurel preferential species (HYDHET, SYMTHE, VIBERU), and to a lesser degree with mixed broadleaved and rhododendron preferential species (Tables 4.1.2 and 4.2). Eleven DF bird species (61%) are wholly positively associated with oak/laurel preferential species, often strongly. Six DF bird species (33%) have positive associations with mixed broadleaved preferential species, whereas one (large hawk cuckoo *Hieroccoccyx sparverioides*) is negatively associated with two mixed broadleaved preferential species, and another species (chestnut-headed tesia) is positively associated with one mixed broadleaved preferential species and negatively associated with another. A single DF bird species is positively associated with a forest clearings preferential species (BERARI). Two of the three DF small mammals are positively associated with just a single oak/laurel preferential species (SYMTHE), whereas DF small mammals are most often positively associated with mixed broadleaved preferential species (specifically FICNER, LITELO, PERCLA, and QUEOXY; Table 4.2).

Thirty percent of VE species are associated with the basal area of BERARI (Tables 4.1.3 and 4.2), a preferential species of the clearings association (none are associated with the second clearings preferential species, VIBERU, perhaps because VIBERU is ubiquitous). One VE species (pygmy shrew *Suncus etruscus*) is positively associated with basal area of two mixed broadleaved preferential species (FICNER and PERCLA), another (house mouse *Mus musculus*) with an oak/laurel preferential species (SYMTHE), and another (Indian blue robin) with a preferential species of the rhododendron association (LYOOVA). Two VE species (12%, pygmy shrew and verditer flycatcher *Muscicapa thalassina*) are positively associated with basal area of a mixed broadleaved preferential species (PERCLA), whereas nine (53%) are negatively associated with those species (especially ACECAM, LINPUL, LITELO, and PERCLA).

Many species of the CF assemblage are positively associated with features of the forest canopy (canopy cover, canopy volume, size and density of large trees; Tables 4.1.1 and 4.2), whereas VE species tend to be negatively associated with those features (Tables 4.1.3 and 4.2). DF species tend to be relatively weakly associated with canopy features, either positively or negatively (Tables 4.1.2 and 4.2). Three DF species (14%) and seven VE species (41%) are positively associated with SD_CC, the standard deviation of canopy cover measurements, indicating they prefer relatively patchy canopy cover. Two CF species (hill partridge *Arborophila torqueola* and brown-toothed shrew *Soriculus caudatus*) and one VE species (streaked laughingthrush *Garrulax lineatus*) are negatively associated with SD_CD, the former preferring very closed canopy and the later very open canopy.

CF species are frequently associated with features of the stems (boles/trunks) of canopy trees (DBH, height, density; TBA/H through SM_DBH in Tables 4.1.1 and 4.2), whereas most DF species (Tables 4.1.2 and 4.2) are only moderately associated with those features (but few DF small mammal associations with stem features were detected). Most VE species are negatively associated with one or more features of tree stems, often strongly (Tables 4.1.3 and 4.2). The species most positively associated with features of the forest canopy (crowns and stems of canopy trees) are ashy-throated warbler (*Phylloscopus maculipennis*), brown-toothed shrew (*Soriculus caudatus*), chestnut-headed tesia, grey-bellied tesia, hill partridge, rufous-bellied niltava (*Niltava sundara*), scaly-breasted wren babbler, slatey-backed flycatcher (*Ficedula hodgsonii*), streak-breasted scimitar babbler (*Pomatorhinus ruficollis*), and white-browed shortwing, whereas those most negatively associated with features of the forest canopy are brownish-flanked bush warbler (*Cettia fortipes*), green-backed tit (*Parus monticolus*), grey bushchat, house mouse, Indian blue robin, olive-backed pipit (*Anthus hodgsoni*), pygmy shrew, and verditer flycatcher.

Most CF species (65%) are positively associated with one or more features of understory and ground layers (SM_DENS, SRB_COV through HEDGE, Tables 4.1.1 and 4.2), particularly mesic understory variables (BAM_COV and FRN_COV). Nine CF species (45%) are negatively associated with woody shrub variables (S_DENS, SM_DBH through SRB_EDG). Among DF species (Tables 4.1.2 and 4.2), understory/shrub associations are mixed, 60% of species with positive associations and 48% negative (seven species have both positive and negative associations). Most VE species (94%) are associated with understory and ground layer variables, 65% negatively with mesic understory variables (BAM_COV and FRN_COV) and 65% positively with woody shrub variables (Tables 4.1.3 and 4.2). The species most positively associated with the mesic understory variables BAM_COV and FRN_COV are chestnut-headed tesia, grey-bellied tesia, hill partridge, long-tailed shrew (*Soriculus leucops*), scaley-breasted wren babbler, and snowy-browed flycatcher (*Ficedula hyperythra*), whereas those most positively associated with woody shrub variables are chestnut rat (*Niviventer fulvescens*), green-backed tit, grey-winged blackbird (*Turdus boulboul*), Indian blue robin, pygmy wren babbler, and streak-breasted scimitar babbler.

With regard to disturbance variables (STUMP, CUT and PATH), half of CF species (50%) are negatively associated (Tables 4.1.1 and 4.2). Two species (slatey-backed flycatcher and smoke-bellied rat *Niviventer eha*) are positively associated with CUT, and one (rufous-gorgetted flycatcher *Ficedula strophiata*) is positively associated with STUMP. Among DF animal species, nine (43%) are positively associated with disturbance variables, whereas three (14%) are negatively associated (primarily with CUT, Tables 4.1.2 and 4.2). Ten VE species (59%) are positively associated with one or more disturbance variables, often strongly (Tables 4.1.3 and 4.2). Two (rufous-capped babbler *Stachyris ruficeps* and streaked laughingthrush) are negatively associated with STUMP, because stumps do not persist in the environments they occupy. The species most positively associated with disturbance variables are ashy drongo (*Dicrurus leucophaeus),* brown rat (*Rattus rattus*), green-backed tit, grey bushchat, grey-hooded warbler (*Seicercus xanthoschistos*), grey-winged blackbird, Indian blue robin, olive-backed pipit, pygmy shrew, smoke-bellied rat, and verditer flycatcher. Those most negatively associated with disturbance variables are ashy-throated warbler, black-headed shrike babbler (*Pteruthius rufiventer*), brown-toothed shrew, grey-bellied tesia, hill partridge, scaly-breasted wren babbler, snowy-browed flycatcher, and striated laughingthrush (*Garrulax striatus*).

Multivariate habitat associations

Cluster analysis

Cluster analysis (based on habitat values at occupied sites) identified three animal species assemblages (Fig. 4.8), a CF assemblage consisting of 17 bird and 3 small mammal species, a DF assemblage consisting of 18 bird and 3 small mammal species, and a VE assemblage consisting of 15 bird and 2 small mammal species.

Species ordinations in multivariate habitat space

For bird species, an ordination consisting of three PCA axes and 14 habitat variables accounts for 83.2% of the variation in species-habitat associations. I interpret Axis I of this ordination (Fig. 4.9) to be a gradient of disturbance, because CANCOV, LOG, and TBA/H have negative factor loadings and PAST, HEDGE, and PATH have highly positive factor loadings (Table 4.3). I interpret Axis II of the ordination to be a gradient of total woody plant basal area, because TBA/H, S_DENS, and SRB_COV have positive factor loadings and HEDGE and FRN_COV have negative factor loadings. High factor loadings for LYOOVA and STUMP on this axis suggest these variables have high values where total plant basal area is high (i.e., disturbed forest). I interpret Axis III as a gradient of shrub/understory density, because LOG, PAST, SRB_EDGE, and HEDGE have negative factor loadings and S_DENS and SRB_COV have positive factor loadings.

Factor coordinates for individual bird species are provided in Appendix 4.5. Species assemblages occur along Axis I in the expected order: CF, DF, and VE in increasingly disturbed habitats. Species of the DF assemblage are the most tightly clustered, indicating they occur over a relatively narrow range of disturbance, where as species of the VE assemblage occur over a much wider range (Fig. 4.11). On Axis II, all three assemblages are centered near the midpoint. The DF assemblage is tightly clustered just above the axis midpoint, indicating DF species occur over a relatively narrow, and slightly higher, range of woody plant basal area. The CF assemblage occurs over an intermediate range, and the VE assemblage occurs over a much wider range. Axis III (shrub/understory density) was not useful for distinguishing bird species assemblages because all assemblages were centered on the axis midpoint. As with Axes I and II, VE species occupied a much broader range than CF and DF assemblages.

For small mammals, an ordination consisting of three PCA axes and 13 habitat variables accounts for 94.3% of variation in habitat associations. I considered long-tailed shrew, for which there were only six occupied sampling points, an outlier with disproportionate influence, and omitted it from the ordination. Axis III of the ordination explained very little variation (7.5%), and the factor loadings had no clear interpretation, so I omitted Axis III from further analysis. Axes I and II together explained 86.8% of total variation (Afifi et al. 2004 consider 80% explained variation an acceptable minimum). I interpret Axis I of the small mammal ordination (Fig. 4.10) to be a gradient of overall disturbance (as with Axis I for birds), because PATH, HERBS and SRB_EDGE have positive factor loadings and CANCOV, LG_HT and BAM_COV have negative factor loadings (Table 4.4). I interpret Axis II to be a gradient of woody shrub density, because SRB_COV and SRB_EDG have positive factor loadings and BAM_COV, PATH, and CANCOV have negative factor loadings.

Factor coordinates for individual small mammal species are provided in Appendix 4.6. Small mammal assemblages are evenly distributed along Axis I, with no overlap of constituent species, and the expected sequence of CF, DF, and VE along a gradient of increasing disturbance (Fig. 4.12). On Axis II, the DF assemblage loaded positively and narrowly for shrub density, whereas overlapping CF and VE assemblages loaded negatively.

Habitat models

There was no significant variation between 1993 and 1994 spot-map data (U, $z_{0.05} = 0.192$, Appendix 4.7), so I pooled data from both years for all regression analyses.

Among all the species models, the maximum acceptable number of model parameters ranged from 0.5 to 5 ($\bar{x} = 2.7$), and no significant parameter interaction was detected among best subsets of models. None of the models achieved classification rates at commonly accepted levels; the best classified only 52% of occupied sites correctly.

Model development for the grey-bellied tesia (Fig. 4.13) was constrained by small sample size (22 occupied sites in four 9-ha plots), which permitted only single-parameter models. The highest-ranked model is based on a negative relationship with BAM_COV (Table 4.5.1). Taken together, the best four models indicate grey-bellied wren babblers breed in tall, closed (or nearly closed) forest, where forest-interior pastures are lacking, ferns are frequent, and mid-sized trees grow tall in order to reach sunlight through a dense forest canopy.

Model building for the scaly-breasted wren babbler (Fig. 4.14) was also constrained by small sample size to single parameter models (23 occupied sites in five 9-ha plots). The best model was based on a positive relationship with QUELAM (Table 4.5.2). The four best models indicate scaly-breasted wren babblers breed in locations where *Quercus lamellosa* is relatively abundant (mixed broadleaved and rhododendron plant associations, Table 3.2) and forest-interior pastures are uncommon or absent nearby. The third- and fourth-ranked models suggest the species further prefers sites with sparse tree seedlings (low S_CV/H) and small, verdant, canopy gaps, where *Hydrangea heteromalla* would occur (Chapter 3), but both these models failed chi-square likelihood tests.

The white-browed shortwing (Fig. 4.15) was sufficiently abundant to allow models with $\leq$3 parameters (44 occupied sites in six 9-ha plots). The first-ranked model, based on positive relationships with HYDHET, LITELO, and VIBERU, was the only model well-supported by the data ($\Delta AIC_c \leq 2$; Table 4.5.3). All best models considered together indicate white-browed shortwings breed in mixed broadleaf and oak/laurel (disturbed) plant associations where canopy gaps have been colonized by *Hydrangea heteromalla* (a preferential species for the oak/laurel association) or *Viburnum erubescens* (a preferential species for the oak/laurel association and clearings associations), and where *Litsea elongata* (preferential species for the mixed broadleaved association), is relatively abundant. The second- and fourth-ranked models suggest an additional weak relationship with FRN_COV.

Models for pygmy wren babbler (Fig. 4.16) were constrained by small sample size to $\leq$2 parameters (34 occupied sites in seven 9-ha plots). LG_HT contributed significantly to all four best models, but those in which LG_HT was matched with FRN_COV or LYOOVA failed chi-square likelihood tests (Table 4.5.4). The best models subset indicates pygmy wren babblers breed in tall forest where *Persea clarkeana*, a preferential species for the mixed broadleaved plant association (Table 3.2), is relatively abundant. There might also be weak associations with FRN_COV and LYOOVA, which suggests a broad tolerance for environmental moisture. Sites with high fern cover tend to have an otherwise open, mesic, understory, whereas sites with abundant *Lyonia ovalifolia*, a preferential species for the rhododendron association (Table 3.2), tend to have a relatively dense and xeric understory (Chapter 3).

Models for chestnut-headed tesia (Fig. 4.17) could contain $\leq$5 parameters (n = 59 occupied sites in seven 9-ha plots). Only the first and second models are well supported by the data ($\Delta AIC_c \leq 2$, Table 4.5.5), and both include positive relationships with FRN_COV and SYMRAM and a negative relationship with EURACU. The four best models indicate chestnut-headed tesia breeds in disturbed forest near moist forest edges and shaded openings. Fern cover and *Symplocos ramosissima* are relatively abundant in these areas, whereas *Eurya acuminata*, although ubiquitous, is better adapted to relatively xeric edges and exposed openings (Chapter 3). Second- and fourth-ranking models suggest a weak negative relationship with LYOOVA, lending further support to an association with moist and shaded environments. A weak positive relationship with LG_HT suggested by the third- and fourth-ranked models suggest chestnut-headed tesia might prefer sites that, although disturbed, still retain large trees.

Models for the Indian blue robin (Fig. 4.18) could contain up to 5 parameters (n = 61 occupied sites in seven 9-ha plots). Only the first two models were supported well by the data ($\Delta AIC_c \leq 2$, Table 4.5.5). The best models subset indicates Indian blue robins breed in pastures and wood-cutting areas near the village, where *Berberis aristida*, a thorny and disturbance-tolerant shrub (Oliver and Sherpa 1989, Schmidt-Vogt 1990), is relatively abundant. A weak negative relationship with the height to the base of large tree canopies (L_LCAN) is an artifact of having summed stem diameters of multi-stemmed plants (hence, many-stemmed *Berberis aristida* shrubs sometimes qualified as large ($\geq$25 cm DBH) trees).

Models for grey bushchat (Fig. 4.19) were the most constrained by sample size (15 occupied sites in two 9-ha plots). Even single-parameter models technically exceeding Hosmer and Lemeshow's (2000) maximum recommended number of parameters (K = 0.5), but I explored the best single-parameter models nonetheless. Only the first- and second-ranked models, which are based on negative relationships with L_DENS and SYMTHE, are well supported by the data

(ΔAIC $\leq$2, Table 4.5.7). Taken together, the subset of best models indicates grey bushchat breeds in relatively xeric areas (SYMTHE is an oak/laurel preferential species indicative of mesic environments), where large trees are sparse and *Alnus nepalensis* (ALNNEP) is relatively abundant. Grey bushchat was detected only in near-village environments (Chitre Bari and Chitre Kharaka study plots, Fig. 2.5), so preferred breeding sites would have been in pastures, croplands, or thinly-wooded ruderal patches. A weak negative relationship with boulders reflects the relative sparsity of boulders in cultivated areas, where soils are relatively deep.

Conclusions

I identify three animal species assemblages based on habitat values at occupied sites: a closed-canopy assemblage (CF), disturbed forest assemblage (DF), and village environments assemblage (VE). Within these assemblages, I identify species closely associated, or not, with the characteristic compositional and structural features of their respective habitat zones. I also identify individual species most closely associated with features of the forest canopy, understory, and anthropogenic disturbance. Species and species assemblages were best distinguished in multivariate habitat space by an ordination axis consisting of disturbance variables. Secondary ordination axes consisted of variables related to the density of woody plants. Habitat models for selected understory passerines were constrained to 1-5 model parameters by small sample size. Model parameters that best distinguish between occupied and unoccupied sites for these species are related to the abundance of late-successional and pioneer plant species, height and density of large trees, abundance of mesic and xeric understory plant species, and anthropogenic disturbance.

The three analytical techniques I employed for this study - univariate covariation, PCA, and binary logistic regression, each with its own strengths and limitations - were largely corroborative with regard to the habitat associations of animal species and species assemblages. The principal environmental factor differentiating the habitats of CF, DF and VE assemblages is anthropogenic disturbance (i.e., canopy cover, height of large trees, downed logs, footpaths, stumps, and pastures). Species positioned low on this axis are most vulnerable to habitat disturbance because they tend to be associated with tall and closed forest canopies, high density and height of trees, and mesic understory plants, which are all directly degraded by harvest of woody plants. Species positioned midway along the disturbance axis benefit most when forests are disturbed because they tend to be associated with structural heterogeneity. Species positioned high on the disturbance axis benefit most from complete conversion of forest to pastures or cropland because they are associated with very open, anthropogenic, habitats. Inskipp (1989) classified 20% (3/15) of the bird species in my VE assemblage as "adapted to man-modified habitats," versus 6% (1/18) of DF species and 6% (1/17) of CF species (Table 4.1). The role of anthropogenic disturbance in animal species turnovers is explored further in Chapter 5.

The second most influential factor differentiating animal species assemblages was the density or basal area of woody plants. Species that prefer an open understory (e.g., black-headed shrike babbler and hill partridge) are more likely to benefit from decreased shrub density, as might occur where forests are heavily grazed. Species associated with pastures or croplands would also benefit from decreased shrub density. Species that prefer dense understories (e.g., scaly-breasted wren babbler) or shrubland (e.g., India blue robin) might benefit from increased woody plant density, as occurs after the forest canopy is thinned or removed.

Small sample size limited the power of univariate means tests, as well as the number and classification power of predictor variables for habitat models, and was partly due to my use of a multi-species, gradient-oriented, study design, and a multipurpose sampling grid.

It is important to recognize that the findings of this chapter, and inferences I have made from them, become less applicable with increasing distance from Chitre Village. Despite this limitation, local-scale studies often provide the initial quantitative insights into factors responsible for patterns of habitat use (Morrison et al. 1992, Block and Brennan 1993). Scientific progress is incremental. Future researchers should employ a more focused sampling design to verify and expand my findings, and add or substitute parameters to make my models applicable and reliable across the region. Chapter 6 explores how the findings of this chapter can be applied elsewhere in the region.

TABLE 4.1.1. Covariation of occupancy and abundance with mean habitat values for bird species of the closed-canopy assemblage[A]. Smaller font indicates sign and *P*-value of Mann-Whitney *U* tests for microscale associations with site occupancy (adjusted for ties); larger font, sign and *P*-value of Pearson *r* correlation coefficients for macroscale associations with zonal abundance (+ or -, $P \leq 0.05$; ++ or - -, $P \leq 0.01$; +++ or - - -, $P \leq 0.001$). Underscore indicates species "adapted to man-modified habitats" (Inskipp 1989). Woody plant species detected at <10 sample sites omitted.

Variable[B]	Babbler b-e sh	Babbler b-h sh	Babbler r-t w	Babbler sc-b w	Barbet g	Fantail, y-b	Flycatcher g-h	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Laughingthrush stri	Minla c-t	Nuthatch w-t	Partridge h	Tesia g-b	Warbler a-t
Occupied sites:[C]	6	7	6	47	4	12	4	17	16	25	5	10	15	6	36	27	35
SLOPE			+							+		+ +++			+	+	++
CANCOV				++						++					+++	+++	++
SD_CC															-		
T_CV/M		+		++				+		+					+++	+++	++
L_CV/M				+++											+++	+++	++
M_CV/M			+							++		+				+	
S_CV/M			++								++	+				++	
L_LCAN				++							+		+		+++	+++	+
M_LCAN		+		+++				+ +		+				+	+++	+++	+
S_LCAN											+						+
TBA/H				+													

TABLE 4.1.1. Continued.

Variable[B]	Babbler b-e sh	Babbler b-h sh	Babbler r-t w	Babbler sc-b w	Barbet g	Fantail, y-b	Flycatcher g-h	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Laughingthrush stri	Minla c-t	Nuthatch w-t	Partridge h	Tesia g-b	Warbler a-t
VL_DENS															+++	+++	
L_DENS				+++						+							
M_DENS										+							
S_DENS											+						
VL_HT	+																
LG_HT		+		+++				+ +		+		+	+		+++	+++	++
MD_HT		++		++				+ ++		+				+	+++	+++	+
SM_HT			+								+				+++	+	+
VL_DBH																+	
LG_DBH															+	+++	
HT:DBH				++						++					+++	+++	+
MD_DBH			++									-		+			
SM_DBH																	
SRB_COV		-								--	- -				--- --	- -	-

TABLE 4.1.1. Continued.

Variable[B]	Babbler b-e sh	Babbler b-h sh	Babbler r-t w	Babbler sc-b w	Barbet g	Fantail, y-b	Flycatcher g-h	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Laughingthrush stri	Minla c-t	Nuthatch w-t	Partridge h	Tesia g-b	Warbler a-t
SRB_EDG			-						+		- -	-			- - - -	- - - -	-
BAM_COV			+		+					-					+++ +	++	
FRN_COV				++		+	+				++		+		+	+++	
LOG		+		+++		+			++		+				+++	+++	
BLDR			+							++					+++		
PAST				- -											- - -	- - -	-
HEDGE				- -											- - -	-	- -
STUMP					-				+			-			- - -	- - - - -	- -
CUT		-								++		-			- - -	- -	- -
PATH		- -	-	-						-		- -			- - -	- - -	
SP_RICH		+									+ +				+++	++	+
FAGACEA			++	+				+				+			+++	+++	
ERICACEA															-	- - -	
LAURACEA		+	+			+					+				+++	+++	
THEACEA				+					++	+			+				

TABLE 4.1.1. Continued.

Variable[B]	Babbler b-e sh	Babbler b-h sh	Babbler r-t w	Babbler sc-b w	Barbet g	Fantail, y-b	Flycatcher g-h	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Laughingthrush stri	Minla c-t	Nuthatch w-t	Partridge h	Tesia g-b	Warbler a-t
ACECAM		++	+									++			+++		
ALACHI											+						
ALNNEP				-													
BERARI				-											---	--	
CASHYS							+++									-	
DAPBHO																	
EURACU																	
FICNER				-					-							+	
HYDHET				++									+++				
ILESIK				+		+		---	++	+++				++			
LINASS															+	+	
LINPUL		+++															
LITELO		+	++			+						+		+		+	
LYOOVA																--	
MAGCAM									+								

TABLE 4.1.1. Continued.

Variable[B]	Babbler b-e sh	Babbler b-h sh	Babbler r-t w	Babbler sc-b w	Barbet g	Fantail, y-b	Flycatcher g-h	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Laughingthrush stri	Minla c-t	Nuthatch w-t	Partridge h	Tesia g-b	Warbler a-t
MELPIN			++		+						+++				+	++	
MICKIS					+++							+++				++ +	
MYRSEM	-														- -		
PERCLA											+				+++	+++	++ +
PERDUT	-		-				++					+					
PRUVEN		+						+									
QUELAM				+++												+	
QUEOXY										+					+++ +	+++ +	
RHOARB			+														
SYMRAM		+++															
SYMTHE				+++		+			+				+	+ +			
TETFRA			+								++					+	
VIBERU			-														

TABLE 4.1.1. Continued.

[A] Assemblage membership based on cluster analysis of habitat associations.
[B] See Appendix 4.1 for descriptions and Appendix 4.3 for units of measure.
[C] For microscale analysis, 252 total sites, 36 from each of seven 9-ha plots; for macroscale analysis, 3 zones, each consisting of two 9-ha plots (72 sampling sites/zone).

TABLE 4.1.2. Covariation of occupancy with mean habitat values for bird species of the disturbed forest assemblage[A]. Smaller font indicates sign and *P*-value of Mann-Whitney *U* tests for microscale associations with site occupancy (adjusted for ties); larger font, sign and *P*-value of Pearson *r* correlation coefficients for macroscale associations with zonal abundance (+ or -, $P \leq 0.05$; ++ or - -, $P \leq 0.01$; +++ or - - -, $P \leq 0.001$). Underscore indicates species "adapted to man-modified habitats" (Inskipp 1989). Woody plant species detected at <10 sample sites omitted.

Variable[B]	Babbler st-b sc	Babbler p w	Bulbul stri	Cuckoo l h	Fulveta r-w	Fulveta w-b	Laughingthrush c-c	Minla b-w	Niltava r-b	Robin w-t	Shortwing w-b	Sibia r	Sunbird g-t	Tesia c-h	Warbler g-s	Warbler g-h	Yuhina s-t	Yuhina w
Occupied sites:[C]	16	54	8	9	61	14	89	6	83	28	69	32	66	98	61	19	6	53
SLOPE																-		
CANCOV									+	+								
SD_CC		+				+	+											
T_CV/M						-			+					+				
L_CV/M		+							-	- +	+			+++				
M_CV/M	++								+				+			-		
S_CV/M																-		
L_LCAN				- -							+							
M_LCAN						-			+		+			+				
S_LCAN	+						-				++							
TBA/H					+				++		++			++				
VL_DENS										+			+ +					
L_DENS		+			++				+		+++			+++				
M_DENS	+++				++						+			+				
S_DENS	++								-									

TABLE 4.1.2. Continued.

Variable[B]	Babbler st-b sc	Babbler p w	Bulbul stri	Cuckoo l h	Fulveta r-w	Fulveta w-b	Laughingthrush c-c	Minla b-w	Niltava r-b	Robin w-t	Shortwing w-b	Sibia r	Sunbird g-t	Tesia c-h	Warbler g-s	Warbler g-h	Yuhina s-t	Yuhina w
VL_HT							-	+					+					+
LG_HT									++		+			++		-		
MD_HT									++					+				
SM_HT	+											-						
VL_DBH									+									
LG_DBH																		
MD_DBH	+										++	-						
SM_DBH	- -				-							- - -		-				
HT:DBH											+			+				
SRB_COV		+					+							+				+
SRB_EDG		++				+	+			+								
BAM_COV		-		-														
FRN_COV		+									+		+	++				
LOG		++							+++	+	+		+++	+++	++			+
BLDR											+++			+				
HEDGE		- -					+	-	- - -		- - -		- - - - - -	- - -	-			-
STUMP		++		+	+		+							+		+		+
PAST							+											

TABLE 4.1.2. Continued.

Variable[B]	Babbler st-b sc	Babbler p w	Bulbul stri	Cuckoo l h	Fulveta r-w	Fulveta w-b	Laughingthrush c-c	Minla b-w	Niltava r-b	Robin w-t	Shortwing w-b	Sibia r	Sunbird g-t	Tesia c-h	Warbler g-s	Warbler g-h	Yuhina s-t	Yuhina w
CUT										-	-			-		++		
PATH							+		-							+		
SP_RICH	++																	
FAGACEA															-	-		
ERICACEA									-				-		-			
LAURACEA	+										+++			+				
THEACEA		++							+++			+++		+++	+			+++
ACECAM																- -		
ALACHI																		
ALNNEP									- -				-					-
BERARI																		
CASHYS	+++												-					
DAPBHO																		
EURACU										+++ -								
FICNER											-			- - -				
HYDHET		+++	+++	+++					+		++			+++	++			
ILESIK																		
LINASS																		
LINPUL																		

TABLE 4.1.2. Continued.

Variable[B]	Babbler st-b sc	Babbler p w	Bulbul stri	Cuckoo l h	Fulveta r-w	Fulveta w-b	Laughingthrush c-c	Minla b-w	Niltava r-b	Robin w-t	Shortwing w-b	Sibia r	Sunbird g-t	Tesia c-h	Warbler g-s	Warbler g-h	Yuhina s-t	Yuhina w
LITELO	+										++			+				
LYOOVA										-								
MAGCAM				+++						+++								
MELPIN				-										-				
MICKIS														-				
MYRSEM																		
PERCLA	+																	
PERDUT	+															-		
PRUVEN											+							
QUELAM													+					
QUEOXY																		
RHOARB	+																	
SYMRAM			-															
SYMTHE		+++			+				+++	+			+	+++	+		+	+++ +
TETFRA	+						-										-	
VIBERU	-				++				++				++		++			

TABLE 4.1.2. Continued.

[A] Assemblage membership based on cluster analysis of habitat associations.
[B] See Appendix 4.1 for descriptions and Appendix 4.3 for units of measure.
[C] For microscale analysis, 252 total sites, 36 from each of seven 9-ha plots; for macroscale analysis, 3 zones, each consisting of two 9-ha plots (72 sampling sites/zone).

TABLE 4.1.3. Covariation of occupancy with mean habitat values for bird species of the village environments assemblage.[A] Smaller font indicates sign and P-value of Mann-Whitney U tests for microscale associations with site occupancy (adjusted for ties); larger font, sign and P-value of Pearson r correlation coefficients for macroscale associations with zonal abundance (+ or -, $P \leq 0.05$; ++ or - -, $P \leq 0.01$; +++ or - - -, $P \leq 0.001$). Underscore indicates species "adapted to man-modified habitats" (Inskipp 1989). Woody plant species detected at <10 sample sites omitted.

Variable[B]	Babbler g sh	Babbler r-c	Blackbird g-w	Bushchat g	Cuckoo E	Drongo a	Flowerpecker f-b	Flycatcher v	Laughingthrush strkd	Pheasant, N k	Pipit o-b	Robin I b	Tit b-t	Tit g-b	Warbler b-f b
Occupied sites:[C]	4	16	14	32	7	7	4	16	9	4	19	78	6	8	7
SLOPE		++									- - -	- - -			
CANCOV			-	--- -				--- -	-		---	---		-	-
SD_CC			+			+		+	-			+++	+ +	++ +	++
T_CV/M		-		---				-- -			---	---		--	--
L_CV/M		-		---		-	-	-- - -			---	---		--	--
M_CV/M				---				-			---	--			-
S_CV/M				---				-			---				
L_LCAN			---	---		-		---		-	---	--- - -	-	--	-
M_LCAN		-	-	---		-		---			---	---	-	-- -	--
S_LCAN															
TBA/H				---		-		-	-		---			-	-
VL_DENS				--- -							-- -	---			
L_DENS		-		---		-			--		---				--

TABLE 4.1.3. Continued.

Variable[B]	Babbler g sh	Babbler r-c	Blackbird g-w	Bushchat g	Cuckoo E	Drongo a	Flowerpecker f-b	Flycatcher v	Laughingthrush strkd	Pheasant, N k	Pipit o-b	Robin I b	Tit b-t	Tit g-b	Warbler b-f b
M_DENS	+	–		---–		– –	– –		-– –		--–				– –
S_DENS				---	+				-		-	+++		-	
VL_HT	–			–		–	–		–	–	–	-			–
LG_HT		–	--	---		-		---			---	---		---–	-
MD_HT		– –	-	---				---			---	---	-	-–	-
SM_HT			-	---				--			---	---		--	
VL_DBH					–										
LG_DBH				---		-						-	–	–	-
MD_DBH				-		++									-
SM_DBH															
HT:DBH			--	---				---			---	---	–	--–	
SRB_COV			++					+				+++			++
SRB_EDG	+		+++	+						+	+	+++		++	

TABLE 4.1.3. Continued.

Variable[B]	Babbler g sh	Babbler r-c	Blackbird g-w	Bushchat g	Cuckoo E	Drongo a	Flowerpecker f-b	Flycatcher v	Laughingthruish strkd	Pheasant, N k	Pipit o-b	Robin I b	Tit b-t	Tit g-b	Warbler b-f b
BAM_COV			-	---		-		-			---	---		-	-
FRN_COV			---	---				-			---	--- -	-	-	
LOG		--		--- -				-- -	-		--- -	---	-	--	--
BLDR			-	---					--		--	---	-	-	-
PAST			+++	+++				+++			+++	+++		+ +	
HEDGE	+			+++ +	+	+	+	+++	+++ +	+	+++ ++	+++		++	+
STUMP		-	++						--	+		+++			
CUT				+++		++		+++ +			+++	+++	+	+	
PATH			+++	+++		+		++			+++	+++		++	
SP_RICH				---				--		-	---	---			
FAGACEA				---				-			---	---			
ERICACEA										+		+++			
LAURACEA				---				--			---	---			-
THEACEA				---					-		--	+			
ACECAM				-								---			
ALACHI															
ALNNEP		+		---	+	+			--		-				+++
BERARI			+++	---				--		++	+++	+++ +	+		
CASHYS											+				
DAPBHO				-											

TABLE 4.1.3. Continued.

Variable[B]	Babbler g sh	Babbler r-c	Blackbird g-w	Bushchat g	Cuckoo E	Drongo a	Flowerpecker f-b	Flycatcher v	Laughingthrush strkd	Pheasant, N k	Pipit o-b	Robin I b	Tit b-t	Tit g-b	Warbler b-f b
EURACU								++				+++			
FICNER												-			
HYDHET									- -						
ILESIK								-				- -			
LINASS															
LINPUL												- - -	-	-	
LITELO				- -							- -	- -			
LYOOVA								+				+++			
MAGCAM		+	+++				- -								
MELPIN		+										-			
MICKIS															
MYRSEM															
PERCLA				- - -				+			- -			-	
PERDUT															
PRUVEN		-						-							
QUELAM			-	- - - -				-			- -				
QUEOXY				- -							-				
RHOARB															
SYMRAM				-										++	

TABLE 4.1.3. Continued.

Variable[B]	Babbler g sh	Babbler r-c	Blackbird g-w	Bushchat g	Cuckoo E	Drongo a	Flowerpecker f-b	Flycatcher v	Laughingthrush strkd	Pheasant, N k	Pipit o-b	Robin I b	Tit b-t	Tit g-b	Warbler b-f b
SYMTHE				- - -					- -		- -				-
TETFRA				-											
VIBERU				- - -							-				

[A] Assemblage membership based on cluster analysis of habitat associations.
[B] See Appendix 4.1 for descriptions and Appendix 4.3 for units of measure.
[C] For microscale analysis, 252 total sites, 36 from each of seven 9-ha plots; for macroscale analysis, three zones, each comprised of two 9-ha plots (72 sampling sites/zone).

TABLE 4.2. Covariation of small mammal species with mean habitat values. Smaller font indicates sign and *P*-value of Mann-Whitney *U* tests for microscale associations (adjusted for ties); larger font, sign and *P*-value of Pearson *r* correlation coefficients for macroscale associations (+ or -, $P \leq 0.05$; ++ or - -, $P \leq 0.01$; +++ or - - -, $P \leq 0.001$). Woody plant species detected at <10 sample sites omitted.

	CF assemblage			DF assemblage			VE assemblage	
Variable[A]	Shrew l-t	Shrew b-t	Rat s-b	Rat c	Shrew l-c	Rat b	Shrew p	Mouse h
Occupied sites[B]	6	41	40	53	38	25	25	9
SLOPE		++ +						- -
CANCOV		+++					-	-
SD_CC		- -						
T_CV/M		+++	+				- - - -	
L_CV/M		+++	++			- - -	- - -	
M_CV/M								
L_LCAN		+++ +					-	-
M_LCAN		+++					- -	-
S_LCAN		+		- -				
TBA/H		++						
VL_DENS				- -				-
L_DENS		+++					- - -	
M_DENS							-	
S_DENS								+
VL_HT		++						-
LG_HT		+++					- - -	- -
MD_HT		+++					- - - -	-
SM_HT		++		-				
LG_DBH			-			-		
MD_DBH				+				
SM_DBH					-	-		
L:HT:DBH	+	+++	++	-	-			
SRB_COV								
SRB_EDG		- -		+++				
BAM_COV		++					-	
FRN_COV	++	+						-
LOG	+	++					- - -	
BLDR		+++					-	

TABLE 4.2. Continued.

Variable[A]	Shrew l-t	Shrew b-t	Rat s-b	Rat c	Shrew l-c	Rat b	Shrew p	Mouse h
	CF Assemblage			DF Assemblage			VE Assemblage	
PAST		-						+
HEDGE		- -					++	
STUMP				+				
CUT		- -	++			++		
PATH		- - -					++	
SP_RICH		+						
FAGACEA								
ERICACEA								
LAURACEA								
THEACEA					+	+		
ACECAM		+ +					-	
ALACHI								
ALNNEP								
BERARI		+++						+
CASHYS								
DAPBHO								
EURACU								
FICNER						+	+	
HYDHET								
ILESIK								
LINASS								
LINPUL		+++						
LITELO		++	+			+		
LYOOVA								
MAGCAM								
MELPIN								
MICKIS								
MYRSEM								
PERCLA		+			+		++	-
PERDUT								
PRUVEN							-	
QUELAM	+	++						
QUEOXY				++				

TABLE 4.2. Continued.

	CF Assemblage			DF Assemblage			VE Assemblage	
Variable[A]	Shrew l-t	Shrew b-t	Rat s-b	Rat c	Shrew l-c	Rat b	Shrew p	Mouse h
RHOARB								
SYMRAM								+++
SYMTHE	+				+			+
TETFRA		+			+		-	
VIBERU								

[A] See Appendix 4.1 for descriptions and Appendix 4.3 for units of measure.
[B] For microscale analysis, 252 total sites, 36 from each of seven 9-ha plots; for macroscale analysis, three zones, each comprised of two 9-ha plots (72 sampling sites/zone).

TABLE 4.3. Factor coordinates on bird PCA axes.

Axis I *Disturbance* (52.4 % total variation)		Axis II *Woody Plant Basal Area* (18.6 % total variation)		Axis III *Shrub/Understory Density* (12.2 % total variation)	
CANCOV	-0.938763	HEDGE	-0.422454	LYOOVA	-0.342465
LG_HT	-0.924986	FRN_COV	-0.232206	LOG	-0.301603
LOG	-0.892202	EURACU	-0.043275	PAST	-0.294833
FRN_COV	-0.886200	PATH	0.043275	SRB_EDG	-0.226955
TBA/H	-0.722474	LOG	0.146232	HEDGE	-0.222678
S_DENS	-0.447149	PAST	0.154032	STUMP	-0.167847
STUMP	0.360415	CANCOV	0.208469	LG_HT	-0.145236
SRB_COV	0.406655	LG_HT	0.211742	TBA/H	-0.135966
EURACU	0.423136	SRB_EDG	0.513487	CANCOV	-0.057002
LYOOVA	0.561517	SRB_COV	0.518648	FRN_COV	0.216434
SRB_EDG	0.687567	S_DENS	0.563421	PATH	0.237729
PAST	0.771563	TBA/H	0.602749	SRB_COV	0.595148
HEDGE	0.808051	LYOOVA	0.631184	S_DENS	0.608716
PATH	0.885362	STUMP	0.787267	EURACU	0.644189

TABLE 4.4. Factor coordinates on small mammal PCA axes.

Axis I *Disturbance* (65.9 % total variation)		Axis II *Woody Shrub Density* (20.9 % total variation)		Axis III (7.5 % total variation)	
CANCOV	-0.982620	BAM_COV	-0.234945	VIBERU	-0.759312
LG_HT	-0.974763	PATH	-0.146055	SRB_COV	-0.236190
LITTER	-0.971613	CANCOV	-0.101449	LITTER	-0.195178
BAM_COV	-0.930210	LITTER	-0.069656	CANCOV	-0.113012
BLDR	-0.928750	BLDR	0.003291	LG_HT	-0.109166
M_DENS	-0.831720	LG_HT	0.137639	PATH	-0.093782
SRB_COV	-0.665604	VIBERU	0.195169	STUMP	-0.062727
STUMP	-0.312421	M_DENS	0.484837	M_DENS	0.051242
VIBERU	0.571273	SRB_COV	0.597865	BAM_COV	0.115474
HERBS	0.601376	SRB_EDG	0.643487	HERBS	0.176607
SRB_EDG	0.668587	HERBS	0.726053	BLDR	0.235361
PATH	0.973203	STUMP	0.908086	SRB_EDG	0.304465

TABLE 4.5.1. Best logistic regression models for grey-bellied tesia microhabitat.

Model comparisons							
Model	K[a]	Likelihood[b]	Likelihood X^2	*P*	D/df[c]	AIC_{cd}	$\triangle AIC_{ce}$
BAM_COV[r]	1	-55.99	9.09	0.003	0.82	116.18	0.00
PAST[r]	1	-57.10	6.88	0.009	0.84	118.39	2.21
MD_HT[r]	1	-57.24	6.60	0.010	0.84	118.67	2.49
FRN_COV[l]	1	-57.51	6.07	0.014	0.85	119.20	3.02

Model parameter estimates

Model 1					Model 2				
Variable	Estimate	SE	Wald	*P*	Variable	Estimate	SE	Wald	P
BAM_COV[r]	-0.001	0.00	6.07	0.01	PAST[r]	-1.255	0.82	2.34	0.13
Model 3					**Model 4**				
Variable	Estimate	SE	Wald	*P*	Variable	Estimate	SE	Wald	P
MD_HT[r]	0.293	0.12	6.33	0.01	FRN_COV[l]	0.865	0.39	5.02	0.03

[a] Number of model parameters excluding intercept; maximum, K+1< n/10; [b] Log-likelihood, [c] Deviance/*df*; [d] AIC_c referenced to model with all listed variables; [e] Deviation from AIC_c of best model; [l] Ln(x+0.5) transformed; [r] Raw data.

TABLE 4.5.2. Best logistic regression models for scaly-breasted wren babbler microhabitat.

Model comparisons							
Model	K[a]	Likelihood[b]	Likelihood X^2	*P*	D/df[c]	AIC_{cd}	$\triangle AIC_{ce}$
QUELAM[pa]	1	-64.27	1.00	0.009	0.76	132.11	0.00
PAST[r]	1	-64.46	0.96	0.017	0.76	133.35	1.24
S_CV/M[r]	1	-66.01	0.99	ns	0.78	136.38	4.27
HYDHET[pa]	1	-66.54	1.00	ns	0.78	137.06	4.59

Model parameter estimates

Model 1					Model 2				
Variable	Estimate	SE	Wald	*P*	Variable	Estimate	SE	Wald	P
QUELAM[pa]	0.645	0.23	7.72	0.005	PAST[r]	-0.440	0.20	4.71	0.030
Model 3					**Model 4**				
Variable	Estimate	SE	Wald	*P*	Variable	Estimate	SE	Wald	P
S_CV/M[r]	-0.333	0.19	3.095	ns	HYDHET[pa]	0.412	0.25	2.66	ns

[a] Number of model parameters excluding intercept; maximum, K+1< n/10; [b] Log-likelihood, [c] Deviance/*df*; [d] AIC_c referenced to model with all listed variables; [e] Deviation from AIC_c of best model; [pa] Dichotomized (presence-absence); [r] Raw data.

TABLE 4.5.3. Best logistic regression models for white-browed shortwing microhabitat.

Model comparisons							
Model	K[a]	Likelihood[b]	Likelihood X^2	P	D/df[c]	AIC_c[d]	ΔAIC_c[e]
HYDHET[pa], LITELO[pa], VIBERU[r]	3	-93.30	11.70	0.00	0.97	195.19	0.00
HYDHET[pa], LITELO[pa], FRN_COV[l] ,	3	-94.93	6.79	0.01	0.98	198.46	3.27
HYDHET[pa] , LITELO[pa]	2	-96.08	9.55	0.00	0.99	198.45	3.26
HYDHET[pa], VIBERU[r] , FRN_COV[l]	3	-97.17	6.81	0.01	1.00	202.94	7.75

Model parameter estimates

Model 1					Model 2				
Variable	Estimate	SE	Wald	P	Variable	Estimate	SE	Wald	P
HYDHET[pa]	0.853	0.32	7.30	0.01	HYDHET[pa]	0.856	0.31	7.39	0.01
LITELO[pa]	0.794	0.32	6.28	0.01	LITELO[pa]	0.696	0.31	4.90	0.03
VIBERU[r]	0.234	0.10	5.40	0.02	FRN_COV[l]	0.342	0.22	2.48	ns
Model 3					**Model 4**				
Variable	Estimate	SE	Wald	P	Variable	Estimate	SE	Wald	P
HYDHET[pa]	0.910	0.31	8.45	0.00	HYDHET[pa]	0.537	0.20	7.00	0.01
LITELO[pa]	0.742	0.31	5.62	0.02	VIBERU[r]	0.147	0.10	2.35	ns
					FRN_COV[l]	0.416	0.21	3.83	ns

[a] Number of model parameters excluding intercept; maximum, K+1< n/10; [b] Log-likelihood, [c] Deviance/*df*; [d] AIC_c referenced to model with all listed variables; [e] Deviation from AIC_c of best model; [l] Ln(x+0.5) transformed; [pa] Dichotomized, [r] Raw data.

TABLE 4.5.4. Best logistic regression models for pygmy wren babbler microhabitat.

Model comparisons							
Model	K[a]	Likelihood[b]	Likelihood X^2	*P*	D/df[c]	AIC_{cd}	ΔAIC_{ce}
LG_HT[r], PERCLA[pa]	2	-86.49	4.04	0.04	0.72	179.36	0.00
LG_HT[r], FRN_COV[l]	2	-87.36	2.31	ns	0.72	181.10	1.74
LG_HT[r]	1	-88.51	20.02	0.00	0.73	181.15	1.79
LG_HT[r], LYOOVA[pa]	2	-78.01	0.04	ns	0.73	181.98	2.62

Model parameter estimates

Model 1					Model 2				
Variable	Estimate	SE	Wald	*P*	Variable	Estimate	SE	Wald	P
LG_HT[r],	0.139	0.05	7.50	0.01	LG_HT[r],	0.139	0.05	6.67	0.01
PERCLA[pa]	0.446	0.22	4.00	0.05	FRN_COV[l]	0.408	0.28	2.15	ns

Model 3					Model 4				
Variable	Estimate	SE	Wald	*P*	Variable	Estimate	SE	Wald	P
LG_HT[r],	0.187	0.04	17.79	0.00	LG_HT[r],	0.162	0.04	11.42	0.00
					LYOOVA[pa]	-0.302	0.26	1.35	ns

[a] Number of model parameters excluding intercept; maximum, K+1< n/10; [b] Log-likelihood, [c] Deviance/*df*; [d] AIC_c referenced to model with all listed variables; [e] Deviation from AIC_c of best model; [l] Ln(x+0.5) transformed; [pa] Dichotomized (presence-absence), [r] Raw data.

TABLE 4.5.5. Best logistic regression models for chestnut-headed tesia microhabitat.

Model comparisons

Model	K[a]	Likelihood[b]	Likelihood X^2	*P*	D/df[c]	AIC_{cd}	$\triangle AIC_{ce}$
FRN_COV[l], SYMRAM[pa], EURACU[r]	3	-111.83	5.88	0.02	1.00	232.1	0.00
FRN_COV[l], SYMRAM[pa], EURACU[r], LYOOVA[pa],	4	-111.11	5.76	0.02	1.00	232.9	0.87
FRN_COV[l], SYMRAM[pa], EURACU[r], LG_HT[r]	4	-111.78	5.94	0.01	1.00	234.3	2.20
FRN_COV[l], SYMRAM[pa], EURACU[r], LG_HT[r], LYOOVA[pa]	5	-111.10	5.79	0.02	1.00	235.3	3.24

Model parameter estimates

Model 1					Model 2				
Variable	Estimate	SE	Wald	*P*	Variable	Estimate	SE	Wald	P
FRN_COV[l]	0.684	0.18	14.38	0.00	FRN_COV[l]	0.589	0.21	8.13	0.00
SYMRAM[pa]	0.820	0.34	5.78	0.02	SYMRAM[pa]	0.828	0.33	6.21	0.01
EURACU[r]	-0.408	0.17	5.75	0.02	EURACU[r]	-0.378	0.17	4.83	0.03
					LYOOVA[pa]	-0.121	0.37	0.11	ns

Model 3					Model 4				
Variable	Estimate	SE	Wald	*P*	Variable	Estimate	SE	Wald	P
FRN_COV[l]	0.649	0.21	9.59	0.00	FRN_COV[l]	0.576	0.23	6.15	0.01
SYMRAM[pa]	0.824	0.34	5.87	0.02	SYMRAM[pa]	0.829	0.33	6.22	0.01
EURACU[r]	-0.387	0.17	5.28	0.02	EURACU[r]	-0.374	0.18	4.58	0.03
LG_HT[r]	0.014	0.04	0.10	ns	LG_HT[r]	0.006	0.04	0.02	ns
					LYOOVA[pa]	-0.123	0.37	0.11	ns

[a] Number of model parameters, excluding intercept and maximum K+1< n/10; [b] Log-likelihood, [c] Deviance/*df*; [d] AIC_c referenced to model with all listed variables; [e] Deviation from AIC_c of best model; [l] Ln(x+0.5) transformed; [pa] Dichotomized (presence-absence), [r] Raw data.

TABLE 4.5.6. Best logistic regression models for Indian blue robin microhabitat.

Model comparisons

Model	K[a]	Likelihood[b]	Likelihood X^2	*P*	D/df[c]	AIC_{cd}	$\triangle AIC_{ce}$
PAST[r], PATH[r], BERARI[pa], STUMP[l]	4	-101.54	7.35	0.01	0.88	213.80	0.00
PAST[r], PATH[r], BERARI[pa], STUMP[l], L_LCAN[l],	5	-101.39	5.12	0.02	0.88	215.86	2.06
PAST[r], PATH[r], BERARI[pa]	3	-103.76	6.73	0.01	0.89	215.95	2.15
PAST[r], PATH[r], BERARI[pa], L_LCAN[l],	4	-103.63	4.72	0.03	0.89	217.97	4.17

Model parameter estimates

Model 1

Variable	Estimate	SE	Wald	*P*
PAST[r]	0.489	0.12	17.69	0.00
PATH[r]	0.013	0.00	7.34	0.01
BERARI[pa]	0.498	0.18	7.46	0.01
STUMP[l]	0.426	0.21	3.97	0.05

Model 2

Variable	Estimate	SE	Wald	P
PAST[r]	0.47	0.12	14.95	0.00
PATH[r]	0.01	0.00	6.48	0.01
BERARI[pa]	0.45	0.20	5.10	0.02
STUMP[l]	0.42	0.21	4.00	0.05
L_LCAN[l]	-0.21	0.37	0.32	ns

Model 3

Variable	Estimate	SE	Wald	*P*
PAST[r]	0.539	0.11	22.37	0.00
PATH[r]	0.013	0.00	7.82	0.01
BERARI[pa]	0.470	0.18	6.86	0.01

Model 4

Variable	Estimate	SE	Wald	P
PAST[r]	0.523	0.12	19.81	0.00
PATH[r]	0.012	0.00	6.91	0.01
BERARI[pa]	0.427	0.20	4.72	0.03
L_LCAN[l]	-0.185	0.35	0.28	ns

TABLE 4.5.6. Continued.

[a] Number of model parameters excluding intercept; maximum, K+1< n/10; [b] Log-likelihood, [c] Deviance/*df*; [d] AIC_c referenced to model with all listed variables; [e] Deviation from AIC_c of best model; [l] Ln(x+0.5) transformed; [pa] Dichotomized (presence-absence), [r] Raw data.

TABLE 4.5.7. Best logistic regression models for grey bushchat microhabitat.

Model comparisons

Model	K[a]	Likelihood[b]	Likelihood X^2	*P*	D/df[c]	AIC_{cd}	$\triangle AIC_{ce}$
L_DENS	1	-24.43	22.89	0.00	0.74	53.18	0.00
SYMTHE	1	-24.73	22.29	0.00	0.75	53.78	0.60
ALNNEP	1	-27.05	17.67	0.00	0.82	58.40	5.22
BLDR	1	-29.52	12.72	0.00	0.89	63.35	10.17

Model parameter estimates

Model 1					Model 2				
Variable	Estimate	SE	Wald	*P*	Variable	Estimate	SE	Wald	P
L_DENS	-1.058	0.29	13.71	0.00	SYMTHE	-1.784	0.54	10.94	0.00
Model 3					**Model 4**				
Variable	Estimate	SE	Wald	*P*	Variable	Estimate	SE	Wald	P
ALNNEP	1.376	0.35	15.52	0.00	BLDR	-1.259	0.46	7.57	0.00

[a] Number of model parameters excluding intercept; maximum, K+1< n/10; [b] Log-likelihood, [c] Deviance/*df*; [d] AIC_c referenced to model with all listed variables; [e] Deviation from AIC_c of best model; [l] Ln(x+0.5) transformed; [pa] Dichotomized (presence-absence), [r] Raw data.

FIGURE 4.1. Cropland habitat near the center of Chitre Village (Chitre Bari study plot), with terraced fields, houses, livestock sheds, living hedgerows, and a few cultivated fodder trees. Note tethered *chau~ri* at right.

FIGURE 4.2. Pasture habitat ~200-300 m from village center (Chitre Kharka study plot).

FIGURE 4.3. Relatively xeric site in Chitre's Disturbed Forest zone, ~450 m from village center (Upper Chaite study plot). Abundant plant species include *Lyonia ovalifolia, Rhododendron arboreum, Quercus lamellosa, Symplocos theifolia*, and *Viburnum erubescens*.

FIGURE 4.4. Relatively mesic site in Chitre's Disturbed Forest zone, ~600 m from village center (Hile study plot). Abundant plants include ferns, oaks, laurels, *Symplocos theifolia*, *Viburnum erubescens*, and *Hydrangea heteromalla*.

FIGURE 4.5. Closed-canopy Forest near Chitre, ~1800 m from village center (Chakedho study plot).

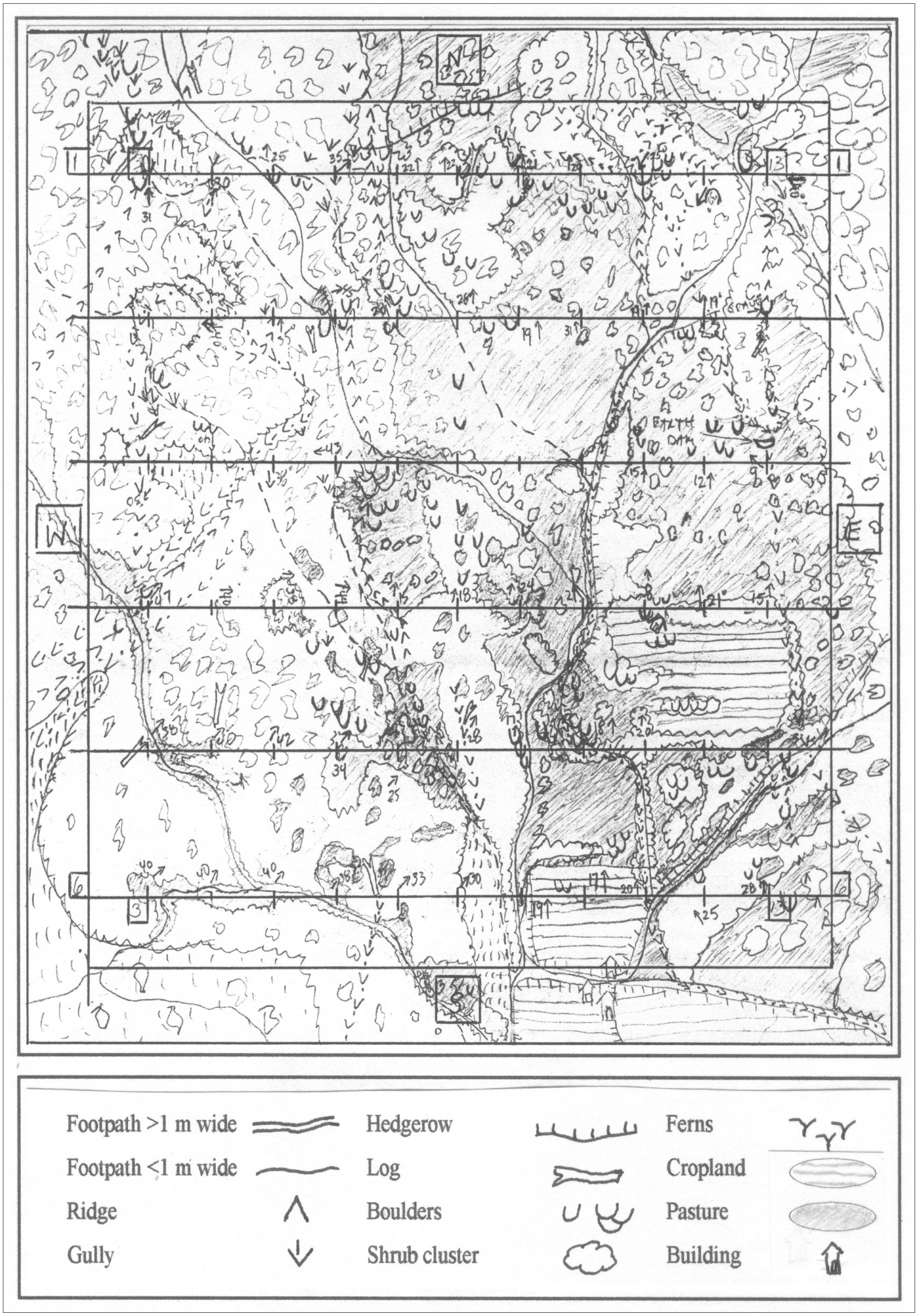

FIGURE 4.6. Sketch map of the Chitre Kharka 9-ha study plot.

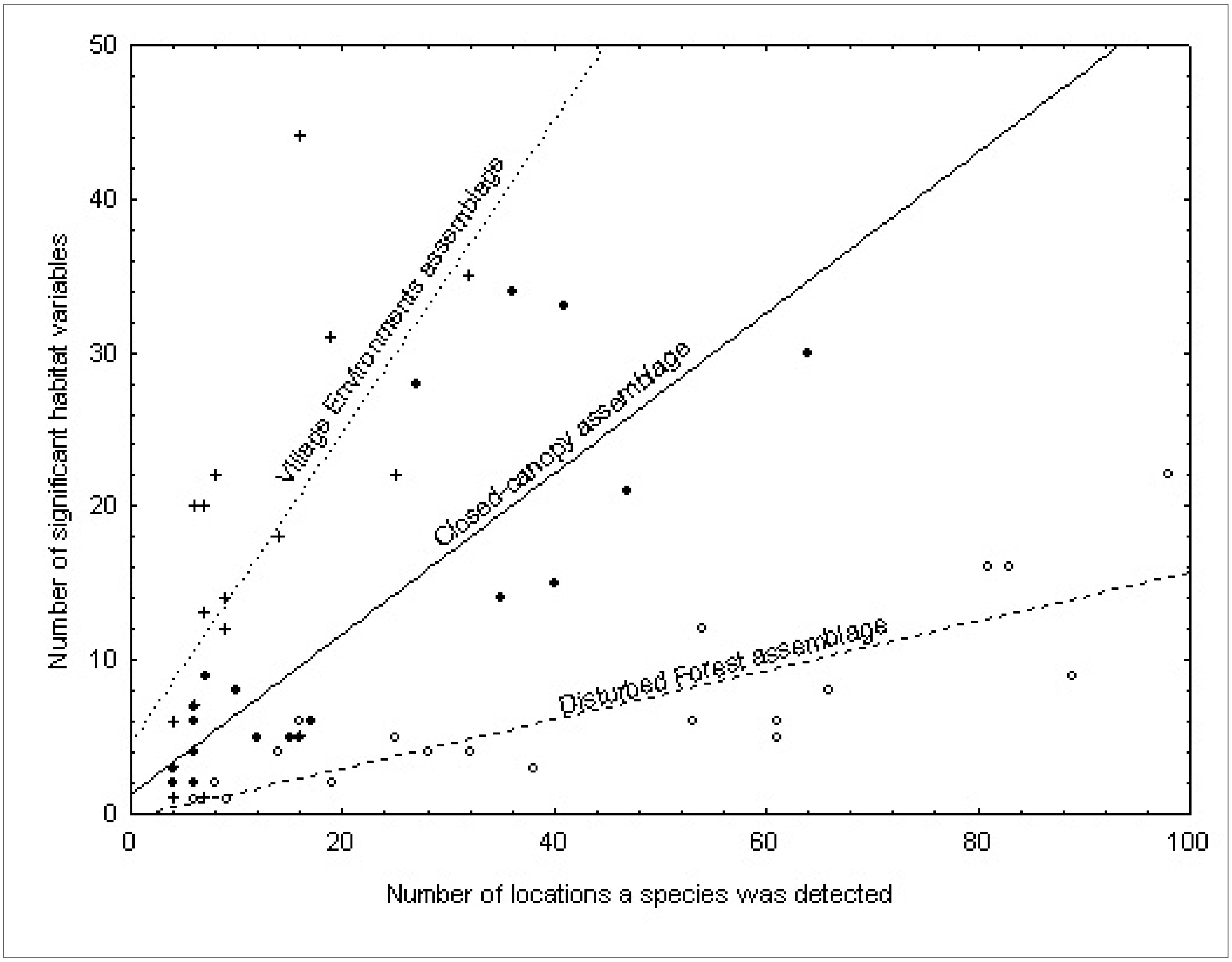

FIGURE 4.7. Correlation between number of detections and number of significant habitat variable associations (birds and small mammals combined; VE assemblage, r = 0.657; DF assemblage, r = 0.846; CF assemblage, r = 0.830).

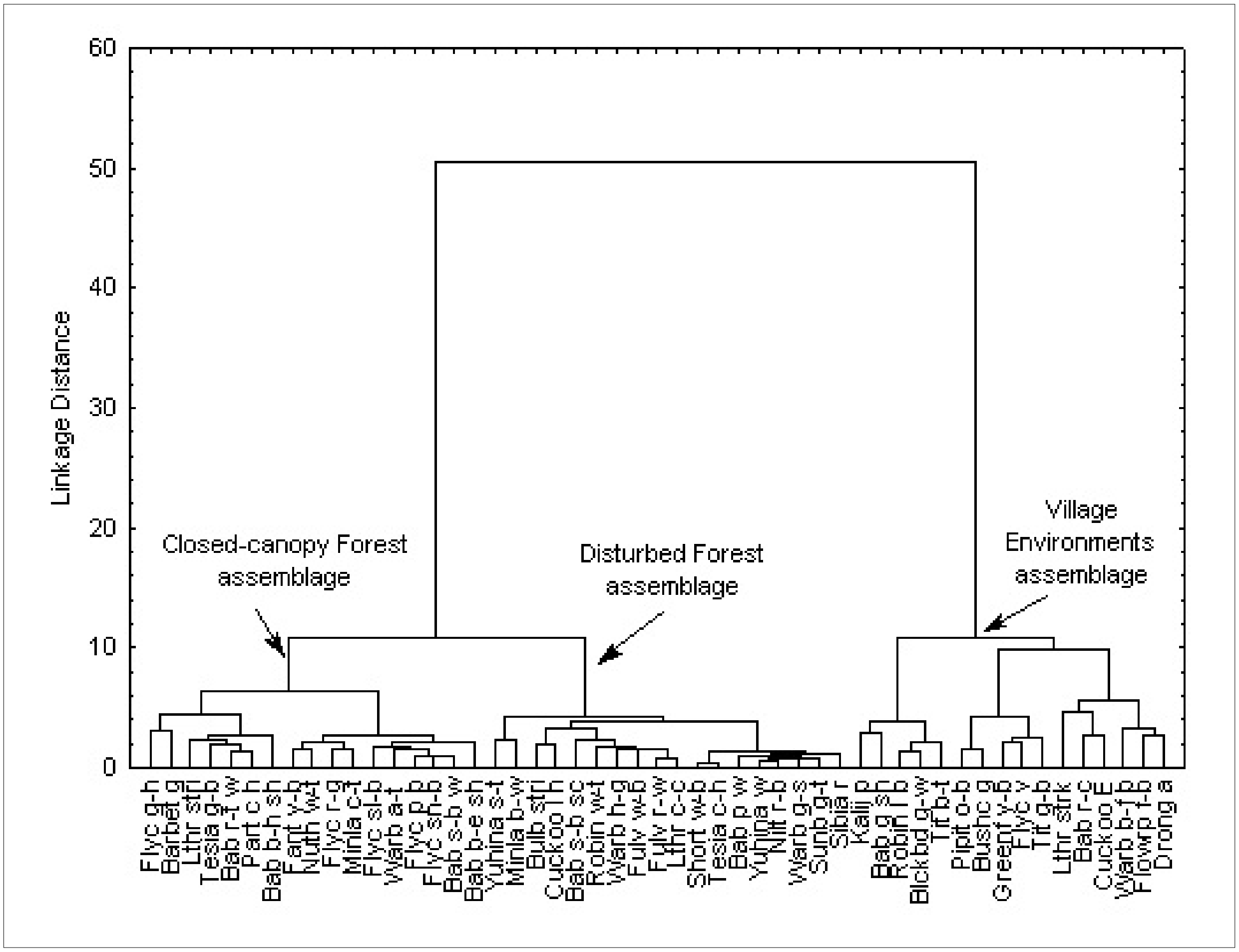

FIGURE 4.8.1. Results of bird species cluster analysis, based on habitat values at occupied sites, Ward's amalgamation method, and Euclidian distance.

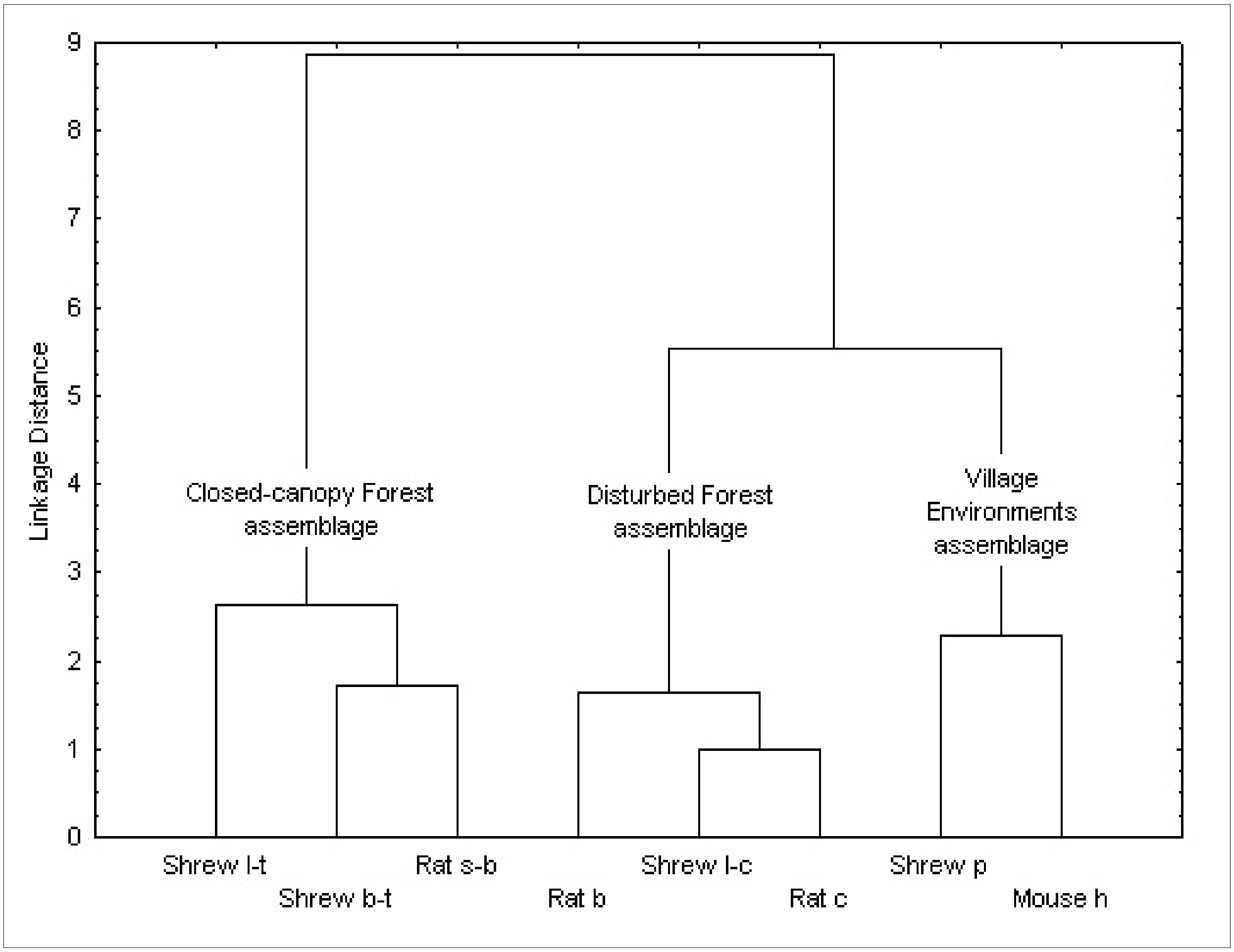

FIGURE 4.8.2. Results of small mammal cluster analysis, based on habitat values at occupied sites, Ward's amalgamation method, and Euclidian distance.

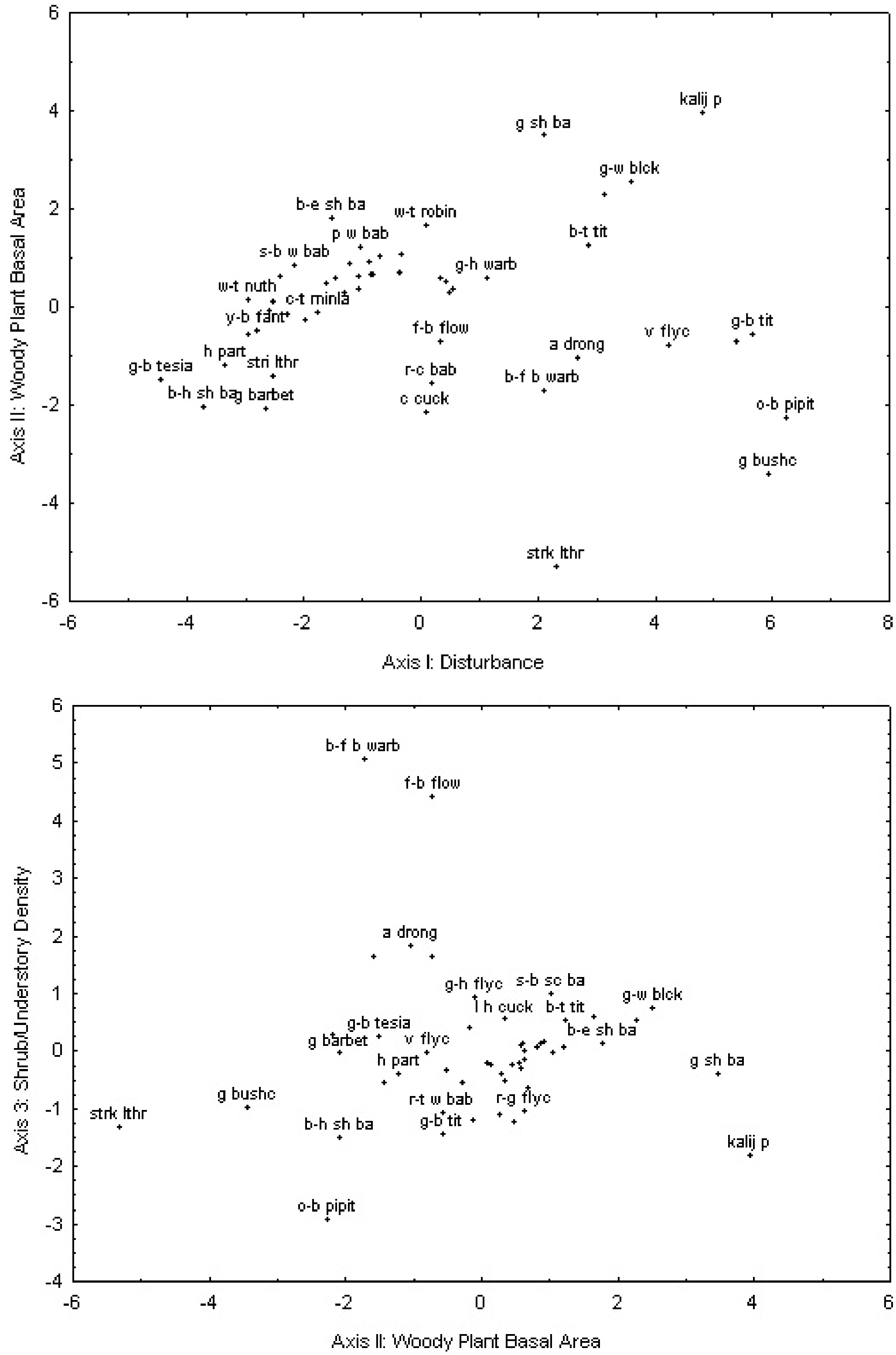

FIGURE 4.9. Ordination of bird species on mean habitat vectors (some name labels omitted for clarity).

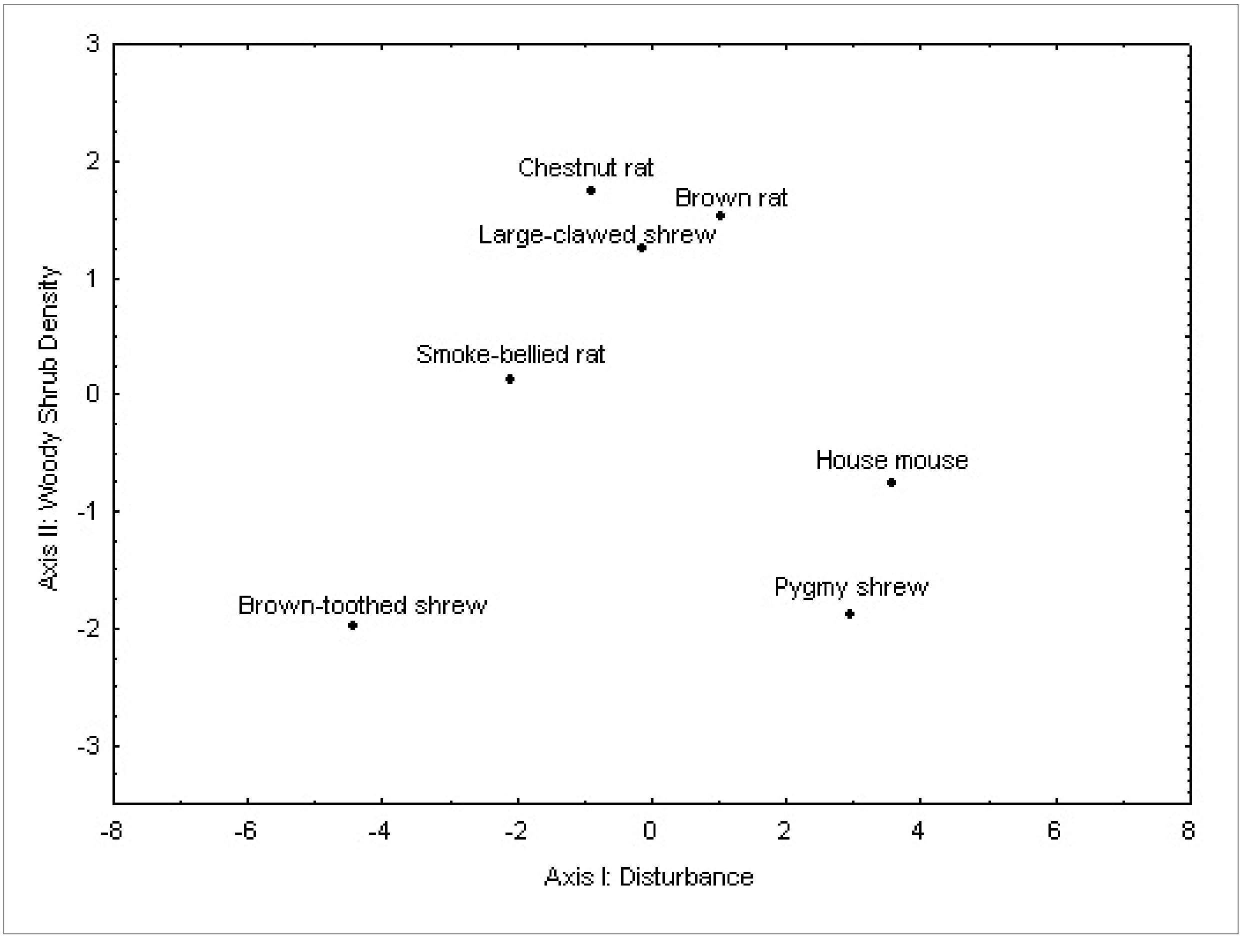

FIGURE 4.10. Ordination of small mammal species on mean habitat vectors.

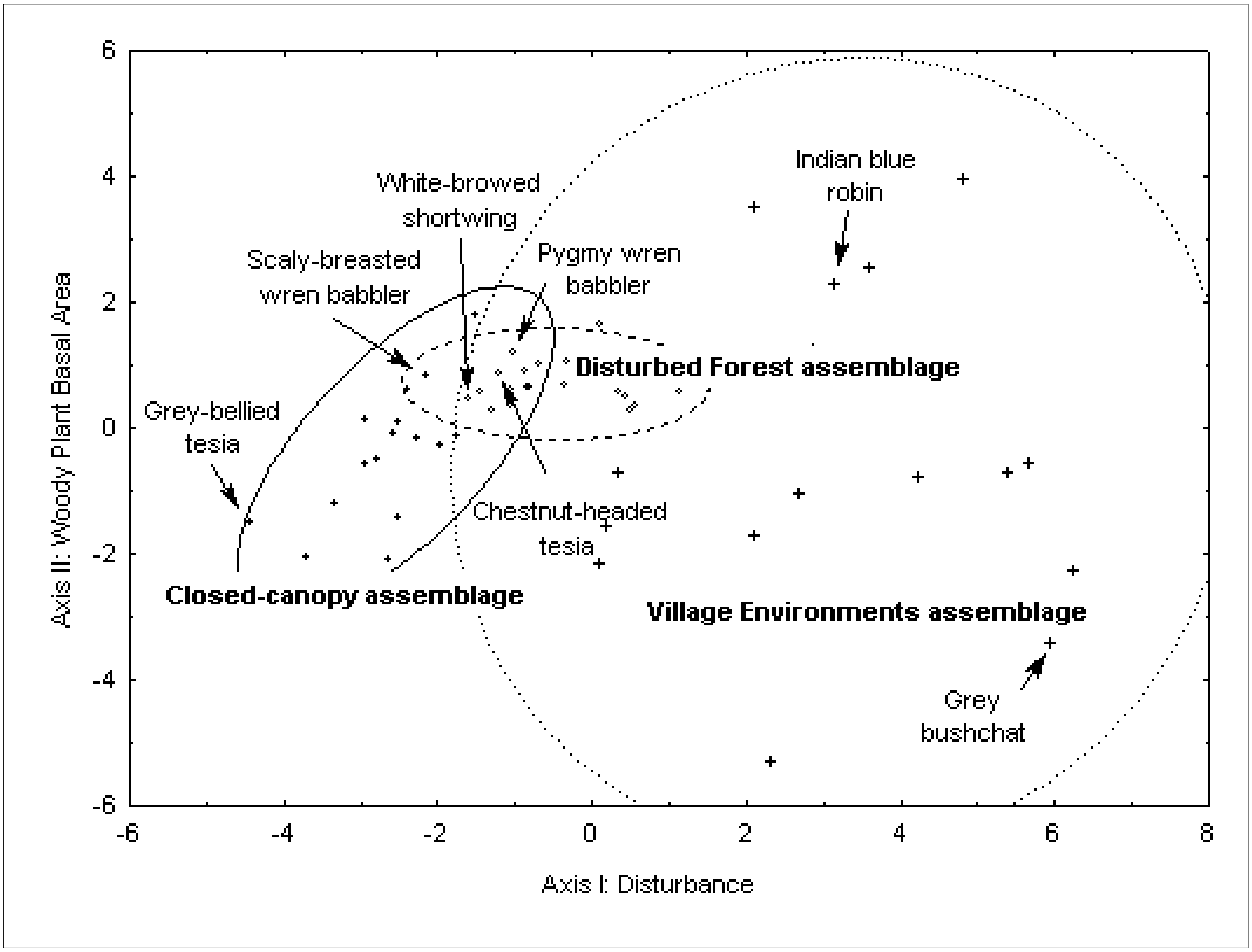

FIGURE 4.11. Ordination of bird assemblages and selected understory species on mean habitat vectors.

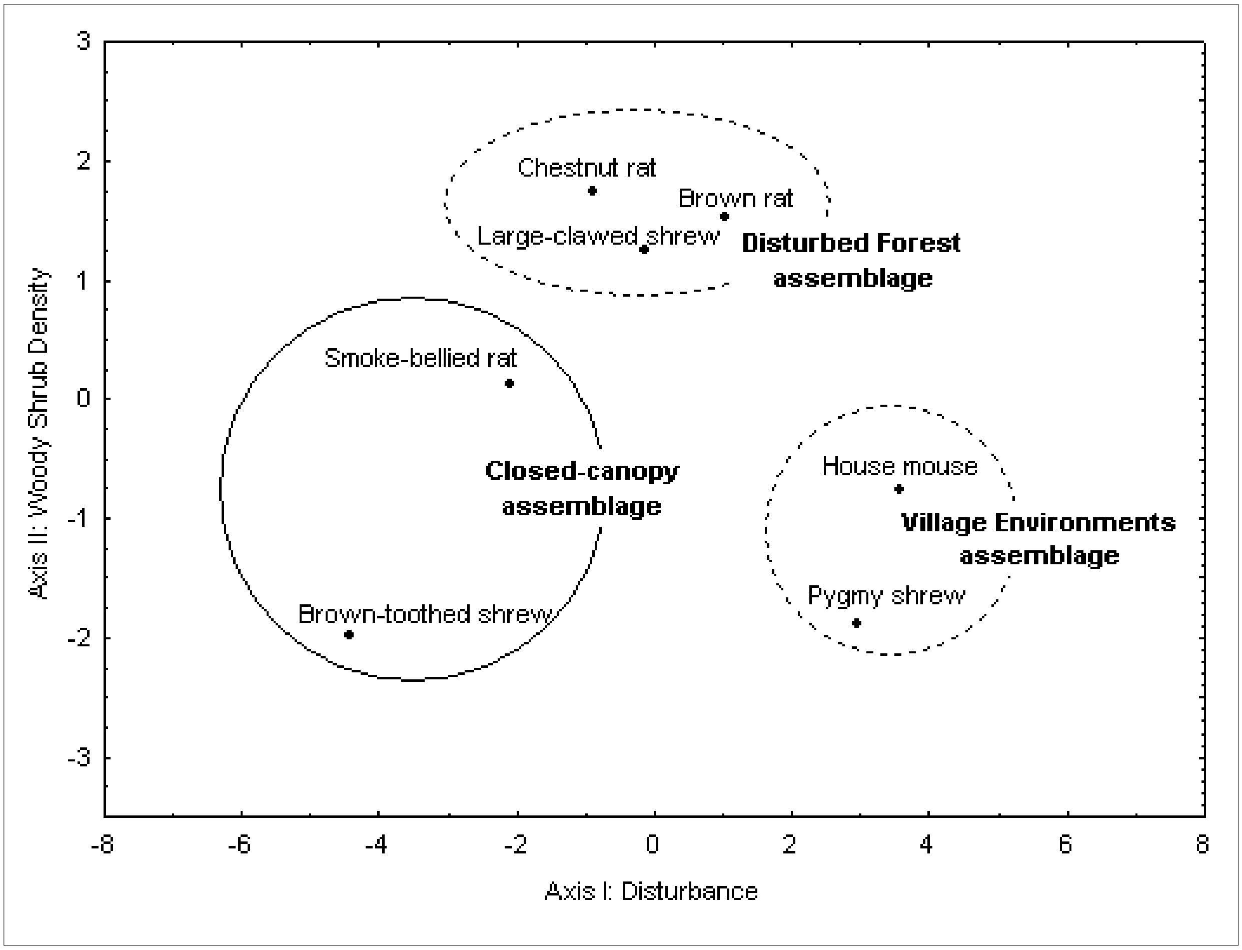

FIGURE 4.12. Ordination of small mammal assemblages on mean habitat vectors.

FIGURE 4.13. Grey-bellied tesia (*Tesia cyaniventer*, photograph by Ramki Sreenivasan / Conservation India)

FIGURE 4.14. Scaley-breasted wren babbler (*Pnoepyga albiventer*, photograph by Pamela Rasmussen).

FIGURE 4.15. Male white-browed shortwing at nest (*Brachypteryx montana*, photograph by James Bland).

FIGURE 4.16. Pygmy wren babbler (*Pnoepyga pusilla*, photograph by M. Strange/VIREO).

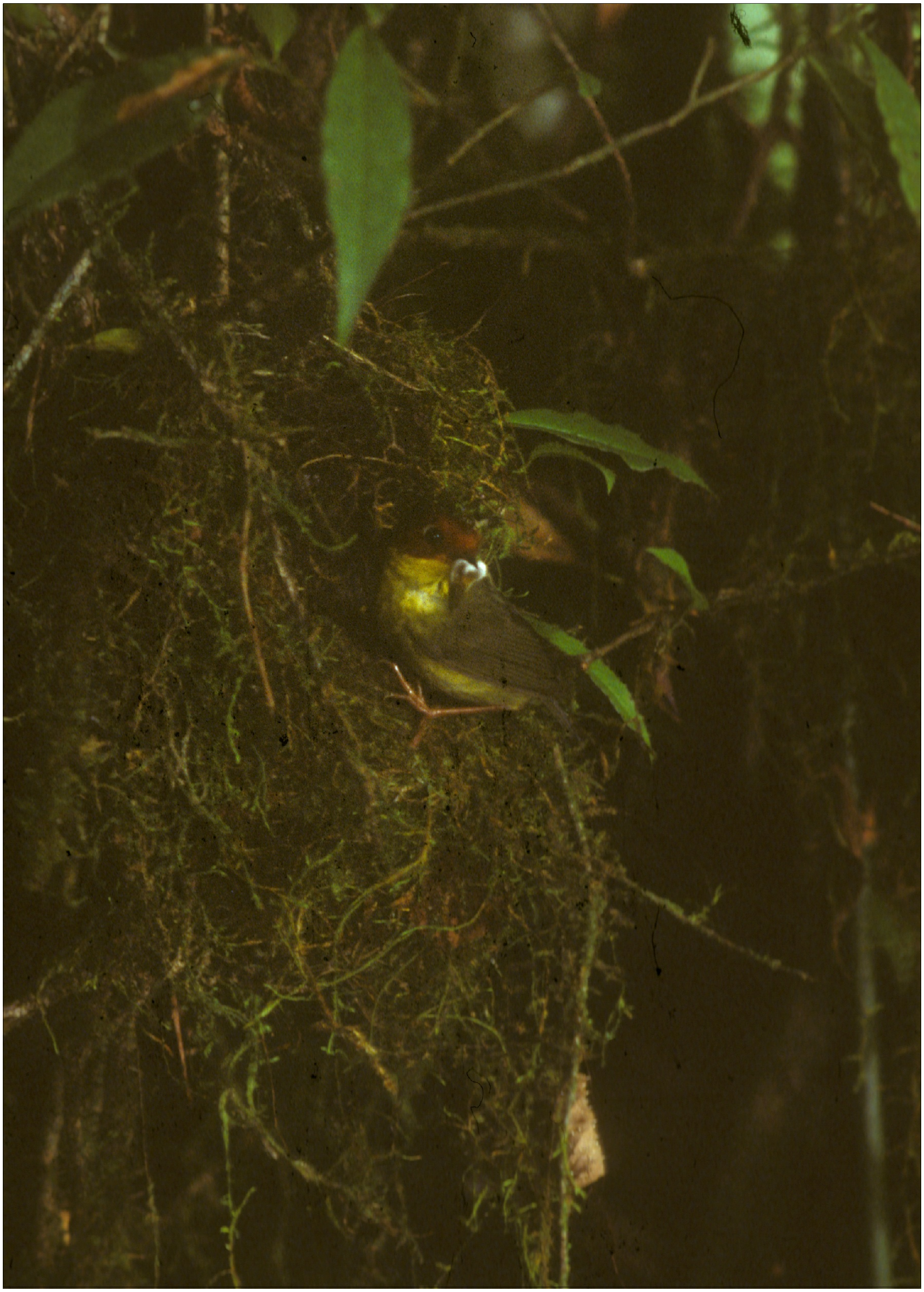

FIGURE 4.17. Chestnut-headed tesia at nest (*Tesia castaneocoronata*, photograph by James Bland).

FIGURE 4.18. Male Indian blue robin at nest (*Luscinia brunnea*, photograph by James Bland).

FIGURE 4.19. Grey bushchat (*Saxicola ferrea*, VIREO).

APPENDIX 4.1. Habitat variables measured. Underscored variables are indicative of forest use or disturbance.

Variable	Code	Description and method
Elevation	ELEV	Best estimates based on 1964 Survey of India topographic sheets, GPS and altimeter/barometer readings. Reported as meters above sea level (masl)
% Slope	SLOPE	Mean of steepest upslope and downslope readings taken from point-center-quarter sampling point with Suunto PM-5 clinometer.
Aspect	ASPECT	Predominant aspect at point-center-quarter sampling point, measured to nearest 45º azimuth.
Distance from village	DIST	Estimated (from aerial photograph) in meters from the geometric center of village houses to the center of 9-ha study plots, following the most direct footpath.
% Canopy cover	CANCOV	Average of 16 concave forest densiometer readings (Forestry Suppliers, Inc., Jackson, MS), 4 from each cardinal compass direction at 5 m distance from point-center-quarter sampling point.
SD of canopy cover	SD_CC	Standard deviation of the 16 canopy cover measures described above.
Height of trees	VL_HT LG_HT MD_HT SM_HT	Measured non-destructively with measuring tape when possible, otherwise with Suunto PM-5 clinometer by triangulation. Twelve trees measured at each point-center-quarter sampling point: the nearest individual in each quadrant in each of three size classes, >25 cm DBH (L), 10-25 cm DBH (M), and 2-10 cm DAB (diameter at base, S). For certain analyses, trees >61 cm DBH were further segregated from the L size class (VL).
Height to base of tree canopy	L_LCAN M_LCAN S_LCAN	Height from ground to visually estimated base of tree canopy. Canopy shapes generalized as spherical, hemispherical, conical, or cylindrical. Twelve trees measured at each point-center-quarter sampling point: the nearest individual in each quadrant in each of three size classes, >25 cm DBH, 10-25 cm DBH, and 2-10 cm DAB (diameter at base).

APPENDIX 4.1. Continued.

Variable	Code	Description and method
Canopy volume of individual trees	T_CV VL_CV L_CV M_CV S_CV	Estimated by classifying canopy shape as spherical, hemispherical, conical or cylindrical, and calculated with respective volume formula in m^3. Summed by size class (VL, L, M, S) and for all trees (T_CV).
Tree canopy volume per hectare	T_CV/M L_CV/M M_CV/M S_CV/M	Combined canopy volume off trees measured at sampling points (m^3/m^2). Estimated for each size class by modeling the 4 sample trees as evenly distributed around the sampling point, at the mean of actual distances, with the inner half of each tree's canopy falling within the plot.
Tree diameter (girth)	VL_DBH LG_DBH MD_DBH SM_DBH	Measured with a diameter tape at breast height for trees $\geq$10 cm diameter and at ground level for trees < 10 cm diameter. Twelve trees measured at each point-center-quarter sampling point: the nearest individual in each quadrant in each of three size classes, >25 cm DBH (L), 10-25 cm DBH (M), and 2-10 cm DAB (diameter at base, S). For certain analyses, trees >61 cm DBH were further segregated from the L size class (VL).
Height to diameter ratio of trees	HT:DBH	Ratio of height (m) to DBH (cm diameter at breast height) of individual trees, averaged across size classes.
Tree density	VL_DENS L_DENS M_DENS S_DENS	Estimated from the mean distance of trees from point-center-quarter sampling points: collective species density = 1/(mean distance)^2 (Higgins et. al 1994). Twelve trees were measured at each point-center-quarter sampling point: the nearest individual in each quadrant in each of three size classes, >25 cm DBH (L), 10-25 cm DBH (M), and 2-10 cm DAB (diameter at base, S). For certain analyses, trees >61 cm DBH were further segregated from the L size class (VL).
Total basal area of trees per unit area	TBA/H	Sum of basal areas of trees measured at sampling points (m^2/ha). Estimated for each size class as: ((mean DBH(m)/2)$^{2*3.1416}$ / (mean Dist(m))^2) x 10,000 (m/ha).

APPENDIX 4.1. Continued.

Variable	Code	Description and method
Basal area of each woody plant species	BA_GGGSSS	Total basal area of the species in m^2/ha. GGGSSS is a six-letter species code comprised of the first three letters of the genus and first three letters of the species.
Basal area of high-value woody plant species	BA_GGGSSS$_h$	Total basal area of the species in m^2/ha. GGGSSS is a six-letter species code comprised of the first three letters of the genus and first three letters of the species. High-value woody plant species are listed in Table 5.3.
Basal area of pioneer woody plant species	BA_GGGSSS$_p$	Total basal area of the species in m^2/ha. GGGSSS is a six-letter species code comprised of the first three letters of the genus and first three letters of the species. Pioneer woody plant species are listed in Table 5.4.
Cover of bamboo, shrubs, and ferns	BAM_COV SRB_COV FRN_COV	Cover of individual plants (cm) intercepted by two 10-m measuring tapes (total = 20 m) stretched ~1 m above the ground. One tape was stretched along a topographic contour 10 m above each point-center-quarter sampling point and the other on a contour 10 m below the sampling point.
Shrub-edge index	SRB_EDG	Determined from a field sketch of each study plot. Number of times two lines drawn diagonally across each 0.25 ha sub-plot intersected the edges of shrub clusters (adapted from Schuerholz 1974).
Abundance of forest litter	LITTER	Visually ranked for area within 2 m radius of small mammal trap settings: 0 = no leaf litter, 1 = light and discontinuous cover, 2 = nearly continuous cover and ≤5 cm deep, 3 = continuous cover and ≥5 cm deep.
Amount of moss	MOSS	Visually ranked for area within 2 m radius of small mammal trap settings, including moss on boulders and bases of trees: 0 = none, 1 = occasional thin patches, 2 = discontinuous patches ≤2 cm deep, 3 = nearly continuous cover, ≥2 cm deep.
Amount of grass and forbes	GRASS FORBES	Visually ranked for area within 2 m radius of small mammal trap settings; 0 = none, 1 = very little, 2 = some, 3 = relatively abundant.

APPENDIX 4.1. Continued.

Variable	Code	Description and method
Frequency of each woody plant species	GGGSSS	Count of each species present at each point-center-quarter sampling point (maximum of 12), converted to individuals/100 trees for some analyses. GGGSSS is a six-letter code comprised of the first three letters of the plant's genus and first three letters of its species.
Frequency of high-value woody plant species	$GGGSSS_h$	Count of each species present at each point-center-quarter sampling point (maximum of 12), converted to individuals/100 trees for some analyses. GGGSSS is a six-letter code comprised of the first three letters of the plant's genus and first three letters of its species. High-value woody plant species are listed in Table 5.3.
Frequency of pioneer woody plant species	$GGGSSS_p$	Count of each species present at each point-center-quarter sampling point (maximum of 12), converted to individuals/100 trees for some analyses. GGGSSS is a six-letter code comprised of the first three letters of the plant's genus and first three letters of its species. Pioneer woody plant species are listed in Table 5.4.
Woody plant species richness	SP_RICH	Number of species represented among the 12 sample trees measured at each point-center-quarter sampling point.
% Oak species	FAGACEA	Proportion of Fagaceae species at sampling points.
% Heather species	ERICACEA	Proportion of Ericaceae species at sampling points.
% Laurel species	LAURACEA	Proportion of Lauraceae species at sampling points.
% Tea species	THEACEA	Proportion of Theaceae species at sampling points.
Abundance of lopped trees	CUT	Each of the 12 trees measured at a point-center-quarter sampling point were visually inspected for past lopping.
Abundance of pastures and boulders	PAST BLDR	Count of quadrants ($\leq$4) in a 1-ha plot around each sampling point where presence was detected.

APPENDIX 4.1. Continued.

Variable	Code	Description and method
Length of hedges and footpaths	HEDGE PATH	Estimated from a field sketch of each study plot, in meters. Some hedges are associated with stone walls, others are not.
Abundance of stumps and logs	STUMP LOG	Counted individually by visual search of 0.25 ha sub-plots. Stumps and logs <10 cm diameter were not counted.

APPENDIX 4.2. Mean values of habitat variables (standard deviation in parentheses). CF is the closed-canopy habitat zone; DF, disturbed forest zone; VE, village environments zone. Woody plant species detected at <10 sample sites omitted.

Variable[A]	Measure	All sites[B]	CF[C]	DF	VE
No. of sites:	- -	252	72	72	72
SLOPE	%	72.8 (29.8)	86.8 (23.6)	68.5 (29.2)	57.5 (29.7)
CANCOV	%	77.2 (31.3)	94.0 (16.0)	86.0 (18)	44.0 (36)
SD_CC	%	13.2	6.6	13.4	21.7
T_CV/M	m^3/m^2	8.7 (10.8)	9.2 (7.0)	7.1 (7.7)	2.0 (2.6)
L_CV/M	m^3/m^2	6.6 (10.5)	7.1 (7.1)	5.6 (7.5)	0.9 (1.2)
M_CV/M	m^3/m^2	1.6 (2.5)	1.6 (1.5)	1.1 (1.3)	0.8 (1.6)
S_CV/M	m^3/m^2	0.5 (1.1)	0.6 (0.6)	0.4 (1.4)	0.3 (0.5)
L_LCAN	m	4.4 (2.8)	6.4 (2.4)	4.0 (2.2)	1.3 (0.9)
M_LCAN	m	3.0 (1.7)	4.0 (1.4)	3.1 (1.6)	1.7 (0.7)
S_LCAN	m	1.8 (0.6)	2.0 (0.6)	1.7 (0.6)	1.6 (0.4)
TBA/H	m^3/ha	48.3 (39.4)	247 (200)	206 (209)	131 (179)
VL_DENS	trees/ha	22.2 (44.2)	30.4 (46.5)	26.6 (50.5)	0.5 (3.8)
L_DENS	trees/ha	241.6 (216.6)	262.2 (191.1)	301.0 (215.2)	142.1 (202.3)
M_DENS	trees/ha	439.8 (492.6)	438.7 (352.9)	466.1 (380.1)	373.2 (655.4)
VL_HT	m	19.1 (6.0)	18.7 (6.0)	18.5 (5.8)	9.5 (0)
LG_HT	m	10.6 (4.9)	13.7 (4.0)	10.8 (4.2)	4.5 (2.6)

APPENDIX 4.2. Continued.

Variable[A]	Measure	All sites[B]	CF[C]	DF	VE
MD_HT	m	6.8 (2.5)	8.2 (1.9)	6.9 (2.2)	4.0 (1.7)
SM_HT	m	3.0 (0.8)	3.6 (0.8)	2.8 (0.8)	2.4 (0.6)
VL_DBH	cm	79.6 (15.0)	77.4 (14.2)	81.7 (16.7)	72.0 (0)
LG_DBH	cm	42.8 (12.0)	46 (23)	43 (9)	30 (16)
MD_DBH	cm	15.7 (2.6)	15.6 (2.3)	16.0 (2.3)	15.2 (3.4)
SM_DBH	cm	4.5 (1.1)	4.8 (1.0)	4.3 (1.1)	4.7 (1.1)
SRB_COV	cm	165.9 (172.3)	72 (81)	220 (142)	242 (233)
SRB_EDG	intercepts	4.3 (4.0)	1.8 (2.5)	5.7 (3.1)	6.3 (5.0)
BAM_COV	cm	34850 (639)	1070 (806)	74 (169)	3 (24)
FRN_COV	cm	774 (6912)	1008 (814)	707 (577)	379 (385)
LOG	#/50 m^2	2.4 (2.5)	3.1 (2.2)	2.7 (2.3)	0.2 (0.4)
BLDR	#/50 m^2	2.2 (1.4)	2.9 (1.2)	2.2 (1.3)	1.2 (1.2)
PAST	count	1 (1.4)	0.5 (1.1)	1.1 (1.4)	1.9 (1.7)
HEDGE	m/9 ha	8.8 (27.1)	0.0	1.9 (8.5)	29.0 (44.0)
STUMP	#/50 m^2	12.7 (11.1)	5.3 (5.8)	16.0 (9.0)	17.0 (15.0)
CUT	#/100 trees	23.7 (22.7)	10.2 (12.5)	20.0 (16.0)	48.2 (21.3)
PATH	m/9 ha	32.5 (36.4)	14 (23)	38 (40)	53 (36)
SP_RICH	sp/12 trees	5.7 (1.8)	7.0 (1.5)	5.3 (1.3)	4.7 (1.6)

APPENDIX 4.2. Continued.

Variable[A]	Measure	All sites[B]	CF[C]	DF	VE
FAGACEAE	#/100 trees	4.3 (6.6)	1.0 (1.)	0.4 (0.7)	0.1 (0.3)
ERICACEA	#/100 trees	8.3 (14.8)	1.1 (2.0)	0.9 (1.7)	1.3 (1.9)
LAURACEA	#/100 trees	9.7 (14.3)	2.4 (2.2)	0.7 (1.0)	0.0 (0.2)
THEACEA	#/100 trees	32.2 (21.0)	2.4 (1.8)	5.5 (1.9)	3.0 (2.6)
BA_ACECAM	m^2/ha	4.4 (28.8)	344.8 (1293.3)	55.9 (209.5)	1.3 (11.1)
BA_ALACHI	m^2/ha	0.6 (5.4)	41.7 (201.1)	0 (0)	1.6 (13.2)
BA_ALNNEP	m^2/ha	0.7 (4.6)	55.7 (262.8)	55.7 (463.1)	124.3 (367.2)
BA_BERARI	m^2/ha	10.4 (31.1)	0 (0)	480.5 (1230.0)	1332.9 (2107.8)
BA_CASHYS	m^2/ha	0.2 (2.9)	0 (0)	0 (0)	50.1 (215.7)
BA_DAPBHO	m^2/ha	0.1 (0.6)	0.8 (2.6)	1.5 (5.7)	1.0 (5.0)
BA_EURACU	m^2/ha	16.1 (39.6)	375.0 (933.7)	525.8 (1154.0)	845.1 (1513.4)
BA_FICNER	m^2/ha	1.7 (6.9)	137.3 (339.0)	0 (0)	295.6 (1243.3)
BA_HYDHET	m^2/ha	1.6 (5.4)	33.6 (147.1)	76.6 (216.3)	15.4 (88.9)
BA_ILESIK	m^2/ha	3.1 (22.6)	174.2 (669.2)	40.6 (191.1)	6.8 (57.4)
BA_LINASS	m^2/ha	1.5 (9.4)	56.4 (239.1)	24.1 (202.9)	0 (0)
BA_LINPUL	m^2/ha	10.0 (83.6)	627.3 (3283.2)	109.7 (547.8)	0 (0)
BA_LITELO	m^2/ha	8.6 (24.5)	455.5 (789.0)	292.6 (989.1)	12.0 (76.4)
BA_LYOOVA	m^2/ha	27.7 (92.0)	820.5 (2326.2)	1100.8 (2602.4)	927.7 (2331.50

APPENDIX 4.2. Continued.

Variable[A]	Measure	All sites[B]	CF[C]	DF	VE
BA_MAGCAM	m^2/ha	2.3 (20.3)	9.2 (77.3)	208.3 (1397.7)	13.4 (112.5)
BA_MELPIN	m^2/ha	3.0 (12.7)	229.5 (763.2)	3.6 (28.2)	32.7 (175.9)
BA_MICKIS	m^2/ha	3.6 (22.8)	627.9 (2400.1)	2.8 (23.5)	27.3 (229.7)
BA_MYRSEM	m^2/ha	0.9 (6.3)	21.3 (90.9)	0 (0)	4.6 (26.0)
BA_PERCLA	m^2/ha	20.4 (45.7)	2004.9 (2989.0)	639.4 (1737.2)	0 (0)
BA_PERDUT	m^2/ha	3.2 (40.0)	59.7 (371.7)	25.8 (211.7)	142.9 (1204.5)
BA_PRUVEN	m^2/ha	2.1 (14.6)	192.0 (752.5)	52.8 (368.0)	0 (0)
BA_QUELAM	m^2/ha	12.0 (37.7)	401.7 (1277.0)	913.9 (2161.5)	13.4 (112.5)
BA_QUEOXY	m^2/ha	11.5 (48.8)	1070.4 (2765.1)	28.9 (145.0)	0 (0)
BA_RHOARB	m^2/ha	4.6 (18.3)	328.0 (1074.4)	81.9 (307.8)	18.9 (91.2)
BA_SYMRAM	m^2/ha	0.6 (3.2)	38.4 (140.8)	54.7 (332.1)	162.3 (709.6)
BA_SYMTHE	m^2/ha	41.8 (59.9)	426.5 (508.8)	2384.4 (1577.6)	684.2 (1085.6)
BA_TETFRA	m^2/ha	5.3 (21.4)	316.6 (659.6)	83.8 (310.5)	23.9 (163.9)
BA_VIBERU	m^2/ha	16.1 (26.8)	308.9 (700.7)	552.3 (579.0)	304.4 (429.5)

[A] See Appendix 4.1 for definitions. [B] Includes all seven 9-ha plots where general faunal surveys were conducted. [C] A third CF plot, Bagalekhop, was omitted to maintain balance sampling across zones. [D] Excludes trees planted near at the periphery of cultivated fields.

APPENDIX 4.3.1. Means of habitat variables at sampling sites occupied by black-eared shrike-babbler - great barbet (standard deviations in parentheses). Bold font indicates occupied sites differ from unoccupied sites at the microhabitat scale; underscore, that species abundance is correlated with a variable at the macrohabitat scale (see Table 4.1 for *P*-values). Plant species detected at <10 sample sites omitted.

Variable[A]	Measure	All sites	Babbler b-e sh	Babbler b-h sh	Babbler g sh	Babbler p w	Babbler r-c	Babbler r-t w	Babbler sc-b w	Babbler st-b s	Barbet g
No. of sites:	- -	252	6	7	4	54	16	6	47	16	4
SLOPE	%	72.8 (29.8)	90.8 (14.0)	75.1 (10.)	60.4 (25.0)	75.0 (23.5)	**93.2** (25.2)	80.5 (19.8)	74.7 (28.3)	83.1 (26.6)	75.8 (24.6)
ASPECT	- -	SW	SW	SW	SW	SW	SW	SW	SW	SW	**NW**
CANCOV	%	77.2 (31.3)	94.2 (4.5)	89.6 (13.7)	75.2 (39.8)	86.2 (14.9)	75.4 (31.2)	95.5 (6.9)	**92.7** (9.6)	90.6 (14.6)	74.4 (40.9)
SD_CC	%	13.2 (13.3)	7.9 (7.2)	11.9 (10.4)	13.0 (10.8)	**15.2** (12.0)	17.1 (15.0)	7.2 (10.7)	8.9 (8.3)	12.5 (11.8)	5.4 (5.3)
T_CV/M	m^3/m^2	7.2 (10.0)	8.9 (9.6)	8.8 (10.1)	8.7 (9.6)	6.8 (6.4)	3.8 (3.6)	9.7 (9.2)	**9.9** (12.3)	11.9 (21.0)	7.3 (7.0)
L_CV/M	m^3/m^2	5.5 (8.5)	7.9 (9.5)	6.7 (7.5)	6.4 (10.2)	**5.3** (6.3)	**1.7** (1.9)	71. (9.3)	**8.3** (12.3)	3.5 (5.1)	5.3 (6.6)
M_CV/M	m^3/m^2	1.5 (5.5)	0.8 (0.5)	1.8 (2.4)	2.1 (1.65)	1.0 (0.9)	1.5 (2.7)	2.4 (3.2)	1.2 (1.1)	**8.0** (20.7)	1.5 (1.3)
S_CV/M	m^3/m^2	0.4 (0.9)	0.2 (0.1)	0.4 (0.4)	0.2 (0.1)	0.5 (0.7)	0.6 (0.7)	0.2 (0.2)	0.4 (0.6)	0.4 (0.4)	0.4 (0.4)
L_LCAN	m	4.4 (2.8)	3.8 (1.7)	6.0 (3.1)	2.8 (1.5)	4.4 (2.6)	3.8 (2.9)	5.9 (1.8)	**5.2** **(2.2)**	4.0 (2.8)	5.6 (3.4)
M_LCAN	m	3.0 (1.7)	3.6 (1.6)	4.1 (1.9)	2.5 (1.3)	3.0 (1.6)	2.6 (1.4)	4.3 (1.5)	**3.8** (1.5)	2.9 (1.5)	3.1 (1.1)
S_LCAN	m	1.8 (0.6)	1.6 (0.3)	1.9 (0.5)	1.8 (0.5)	1.8 (0.6)	1.8 (0.7)	1.9 (0.5)	1.8 (0.5)	1.6 (0.4)	2.0 (0.5)

APPENDIX 4.3.1. Continued.

Variable[A]	Measure	All sites	Babbler b-e sh	Babbler b-h sh	Babbler g sh	Babbler p w	Babbler r-c	Babbler r-t w	Babbler sc-b w	Babbler st-b s	Barbet g
TBA/H	m^2/ha	48.3 (39.4)	53.9 (18.7)	62.5 (52.2)	39.9 (22.2)	62.0 (47.3)	43.6 (49.4)	59.4 (40.4)	**59.4** (40.4)	68.7 (55.9)	45.3 (28.9)
VL_DENS	trees/ha	22.2 (44.3)	28.6 (47.4)	49.4 (80.5)	18.3 (36.5)	25.2 (51.8)	3.7 (8.2)	6.6 (16.1)	35.3 (65.0)	31.3 (61.1)	23.9 (47.9)
L_DENS	trees/ha	241.6 (216.6)	211.2 (33.5)	246.7 (141.7)	173.0 (112.5)	**300.1** (260.1)	**156.9** (179.7)	351.0 (280.5)	**351.0** (280.5)	227.1 (185.4)	246.7 (192.9)
M_DENS	trees/ha	439.8 (492.6)	435.8 (193.1)	488.4 (495.3)	**683.9** (244.1)	478.4 (392.8)	694.2 (1225.3)	443.9 (366.9)	443.9 (366.9)	**864.6** (628.5)	378.4 (274.8)
S_DENS	trees/ha	1565.6 (1681.4)	1525.1 (479.3)	924.9 (823.0)	1504.7 (863.0)	1604.0 (1211.3)	2756.8 (3173.9)	1369.4 (918.7)	1369.4 (918.7)	**2334.0** (1509.5)	1052.5 (799.2)
VL_HT	m	19.1 (6.0)	**28.0** (3.2)	21.1 (3.0)	24.6 (0.0)	19.8 (6.1)	17.6 (4.8)	19.5 (0)	20.4 (5.8)	16.5 (4.0)	28.5 (0)
LG_HT	m	10.6 (4.9)	12.2 (4.9)	12.9 (5.2)	10.5 (5.7)	11.3 (4.4)	8.4 (4.5)	12.5 (3.66)	**12.5** (3.66)	9.8 (4.0)	12.1 (6.5)
MD_HT	m	6.8 (2.5)	7.6 (2.6)	9.1 (3.4)	6.3 (2.4)	7.0 (2.2)	6.0 (1.9)	**7.7** (2.0)	**7.7** (2.0)	7.4 (2.8)	7.7 (1.8)
SM_HT	m	3.0 (0.8)	2.7 (0.7)	2.8 (0.8)	2.8 (0.6)	3.0 (0.9)	2.9 (0.7)	3.1 (0.9)	3.1 (0.9)	2.8 (0.7)	3.6 (1.0)
VL_DBH	cm	79.6 (15.0)	99.2 (12.8)	87.2 (19.0)	80.0 (0.0)	78.7 (14.9)	82.1 (20.6)	90.5 (0)	81.5 (15.4)	82.5 (16.0)	95.5 (0)
LG_DBH	cm	42.8 (12.0)	49.0 (9.8)	49.6 (12.8)	42.3 (7.4)	44.0 (10.0)	39.2 (16.1)	41.4 (10.0)	41.4 (10.0)	45.7 (12.0)	44.0 (14.7)
MD_DBH	cm	15.7 (2.6)	16.0 (1.1)	15.7 (1.8)	15.9 (2.6)	15.7 (2.0)	15.2 (2.3)	**19.0** (2.4)	15.9 (2.0)	**16.7** (1.8)	17.1 (3.8)
SM_DBH	cm	4.5 (1.1)	4.3 (1.4)	4.3 (1.0)	4.3 (0.5)	4.4 (1.3)	4.4 (1.0)	4.4 (1.0)	4.4 (1.0)	**3.7** (0.9)	4.8 (1.1)

APPENDIX 4.3.1. Continued.

Variable[A]	Measure	All sites	Babbler b-e sh	Babbler b-h sh	Babbler g sh	Babbler p w	Babbler r-c	Babbler r-t w	Babbler sc-b w	Babbler st-b s	Barbet g
HT:DBH	m/cm	0.46 (0.12)	0.47 (0.17)	0.51 (0.13)	0.43 (0.11)	0.47 (0.10)	0.43 (0.08)	0.51 (0.10)	**0.50** (0.09)	0.48 (0.09)	0.52 (0.19)
SRB_COV	cm	165.9 (172.3)	162.5 (96.5)	**55.4** (70.4)	183.8 (164.4)	**193.0** (149.8)	172.7 (164.3)	83.8 (78.6)	159.4 (135.5)	196.1 (129.2)	45.3 (22.4)
SRB_EDG	line intercept	4.3 (4.0)	5.0 (1.8)	3.0 (2.6)	**8.75** (4.6)	**5.4** (3.9)	3.8 (4.3)	**1.3** (3.0)	4.1 (3.8)	3.5 (3.1)	2.3 (3.3)
BAM_COV	cm	348.5 (639.5)	402.5 (532.9)	37.7 (84.5)	7.0 (14.0)	**207.4** (430.0)	199.4 (447.6)	**985.8** (857.4)	280.1 (456.7)	514.9 (950.0)	528.8 (537.6)
FRN_COV	cm	774.0 (6912.4)	606.0 (290.5)	1060.1 (623.2)	459.0 (378.3)	**903.0** (648.3)	730.3 (568.9)	1088.3 (849.9)	**939.9** (578.0)	566.7 (443.7)	1152.0 (659.1)
LOG	# /50m^2	2.4 (2.5)	3.3 (1.9)	**4** (2)	1.25 (1.9)	**3.2** (2.7)	**0.9** (1.4)	2.7 (1.9)	**3.3** (2.2	1.8 (1.9)	3.0 (1.9)
BLDR	# /50m^2	2.2 (1.4)	2.5 (0.8)	2.4 (1.3)	2.0 (1.4)	2.2 (1.3)	1.8 (1.5)	**3.3** (0.7)	2.4 (1.4)	2.3 (1.5)	1.5 (1.1)
PAST	count of quadrants	1 (1.4)	0.8 (0.9)	0.3 (0.7)	1.0 (2.0)	0.8 (1.3)	0.9 (1.5)	0.5 (1.1)	**0.4** (1.4)	1.3 (1.5)	1.0 (1.7)
HEDGE	m /9 ha	8.8 (27.1)	0 (0)	0 (0)	0 (0)	**1.6** (8.2)	15.6 (56.2)	**0** (0)	**0** (0)	0 (0)	0 (0)
STUMP	# /50m^2	12.7 (11.1)	14.5 (6.0)	5.7 (5.1)	20.0 (10.7)	**16.6** (11.9)	**7.5** (6.8)	8.0 (4.4)	13.5 (10.3)	11.7 (8.8)	4.8 (4.3)
CUT	# /100 trees	23.7 (22.7)	16.7 (13.9)	**7.1** (15.5)	20.8 (22.0)	4.3 (5.6)	26.6 (20.2)	13.9 (18.8)	17.6 (18.5)	28.1 (23.5)	22.9 (10.5)
PATH	m /9 ha	32.5 (36.4)	15.0 (1.6)	**0** (0)	22.8 (23.1)	30.8 (37.4)	36.6 (36.4)	17.5 (24.8)	**23.0** (31.2)	31.5 (27.4)	13.8 (23.8)
SP_RICH	# /12 trees	5.7 (1.8)	6.3 (1.6)	**7.1** (1.5)	5.3 (1.7)	5.8 (1.6)	5.5 (1.7)	6.7 (1.5)	5.7 (1.6)	5.9 (1.9)	5.5 (1.8)

APPENDIX 4.3.1. Continued.

Variable[A]	Measure	All sites	Babbler b-e sh	Babbler b-h sh	Babbler g sh	Babbler p w	Babbler r-c	Babbler r-t w	Babbler sc-b w	Babbler st-b s	Barbet g
FAGACEA	# /100 trees	4.3 (6.6)	6.9 (8.2)	8.3 (13.7)	6.3 (12.5)	4.3 (5.6)	2.6 (5.0)	9.7 (9.7)	**5.3** (5.9)	5.2 (8.0)	4.2 (4.8)
ERICACEA	# /100 trees	8.3 (14.8)	8.3 (13.9)	4.2 (7.5)	16.7 (11.8)	14.6 (4.8)	2.6 (4.0)	4.2 (7.0)	7.5 (15.1)	8.3 (13.6)	0 (0)
LAURACEA	# /100 trees	9.7 (14.3)	11.1 (12.5)	**12.5** (14.9)	2.1 (4.2)	4.2 (4.8)	7.8 (15.1)	22.2 (24.0)	11.2 (14.5)	10.9 (17.9)	4.2 (4.8)
THEACEA	# /100 trees	32.2 (21.0)	40.3 (8.2)	26.4 (18.1)	29.2 (25.0)	**33.3** (12.7)	31.3 (24.4)	25.0 (20.4)	**38.5** (20.7)	34.4 (23.9)	39.6 (14.2)
BA_ACECAM	m^2/ha	4.4 (28.8)	4.3 (10.5)	**72.7** (159.1)	0 (0)	1.1 (4.7)	3.3 (7.9)	0.2 (0.4)	5.9 (17.1)	26.9 (107.6)	0 (0)
BA_ALACHI	m^2/ha	0.6 (5.4)	0 (0)	0 (0)	0 (0)	1.7 (10.6)	0 (0)	0 (0)	0 (0)	0.9 (3.4)	0 (0)
BA_ALNNEP	m^2/ha	0.7 (4.6)	0 (0)	0 (0)	0 (0)	0.4 (2.6)	**1.0** (3.5)	0 (0)	**0** (0)	1.0 (4.2)	0 (0)
BA_BERARI	m^2/ha	10.4 (31.1)	13.8 (33.7)	1.4 (3.3)	14.9 (19.9)	14.7 (40.6)	0.9 (2.5)	0 (0)	**3.5** (15.8)	4.1 (14.3)	2.9 (5.7)
BA_CASHYS	m^2/ha	0.2 (2.9)	0 (0)	0 (0)	0 (0)	0.9 (6.3)	0.1 (0.2)	0 (0)	0 (0)	**0.6** (1.7)	0 (0)
BA_DAPBHO	m^2/ha	0.1 (0.6)	0 (0)	0.01 (0.04)	0.4 (0.8)	0.2 (0.6)	0.1 (0.2)	0.1 (0.1)	0.03 (0.1)	0.1 (0.2)	0 (0)
BA_EURACU	m^2/ha	16.1 (39.6)	6.6 (5.9)	10.8 (20.9)	31.7 (36.2)	23.6 (62.1)	21.8 (40.7)	20.2 (49.1)	11.2 (24.9)	13.9 (24.4)	30.5 (59.9)
BA_FICNER	m^2/ha	1.7 (6.9)	0 (0)	0 (0)	0 (0)	2.5 (7.4)	0.2 (0.5)	1.1 (2.8)	**0.7** (3.0)	0.02 (0.08)	10.8 (19.0)
BA_HYDHET	m^2/ha	1.6 (5.4)	1.4 (3.5)	2.7 (7.2)	0 (0)	**2.7** (7.2)	2.3 (9.4)	0 (0)	**3.1** (6.8)	2.3 (9.4)	4.8 (9.5)

APPENDIX 4.3.1. Continued.

Variable[A]	Measure	All sites	Babbler b-e sh	Babbler b-h sh	Babbler g sh	Babbler p w	Babbler r-c	Babbler r-t w	Babbler sc-b w	Babbler st-b s	Barbet g
BA_ILESIK	m^2/ha	3.1 (22.6)	0 (0)	0 (0)	0 (0)	1.7 (7.0)	0 (0)	0 (0)	**10.3** (49.7)	0.4 (1.5)	10.2 (20.4)
BA_LINASS	m^2/ha	1.5 (9.4)	6.5 (15.9)	0 (0)	0 (0)	0 (0)	0 (0)	1.3 (3.2)	2.1 (13.5)	0.2 (0.8)	0 (0)
BA_LINPUL	m^2/ha	10.0 (83.6)	17.1 (41.8)	**61.4** (157.5)	0 (0)	2.3 (9.9)	3.1 (11.8)	1.9 (4.6)	3.4 (13.6)	28.4 (104.4)	0 (0)
BA_LITELO	m^2/ha	8.6 (24.5)	0 (0)	**28.2** (45.1)	1.0 (2.0)	6.1 (13.9)	6.0 (19.4)	22.9 (29.8)	10.9 (22.1)	2.9 (6.3)	0 (0)
BA_LYOOVA	m^2/ha	27.7 (92.0)	8.7 (15.0)	5.9 (15.7)	17.1 (25.4)	51.1 (157.2)	8.2 (22.9)	8.0 (14.2)	26.0 (85.0)	36.5 (90.1)	0 (0)
BA_MAGCAM	m^2/ha	2.3 (20.3)	0 (0)	0 (0)	0 (0)	4.6 (33.6)	**12.4** (48.1)	0 (0)	6.0 (36.0)	0 (0)	0 (0)
BA_MELPIN	m^2/ha	3.0 (12.7)	0 (0)	0 (0)	0 (0)	1.0 (4.5)	**5.2** (9.0)	**32.2** (57.6)	4.6 (13.9)	2.2 (5.5)	0.7 (1.4)
BA_MICKIS	m^2/ha	3.6 (22.8)	0 (0)	0 (0)	0 (0)	0.4 (2.7)	8.5 (33.9)	3.4 (8.4)	0.4 (3.0)	3.7 (14.7)	**59.3** (105.3)
BA_MYRSEM	m^2/ha	0.9 (6.3)	**0.7** (1.5)	0 (0)	4.8 (9.6)	1.2 (6.7)	0.6 (2.1)	0.2 (0.6)	1.0 (6.7)	1.7 (6.9)	0 (0)
BA_PERCLA	m^2/ha	20.4 (45.7)	36.1 (42.)	64.4 (102.2)	0 (0)	16.5 (51.3)	8.4 (20.8)	17.9 (27.3)	20.9 (44.7)	23.5 (55.0)	24.5 (35.8)
BA_PERDUT	m^2/ha	3.2 (40.0)	**2.0** (4.8)	6.2 (16.5)	0 (0)	13.7 (85.9)	39.2 (156.8)	**0.9** (2.1)	0.5 (3.0)	**41.9** (156.4)	0 (0)
BA_PRUVEN	m^2/ha	2.1 (14.6)	0 (0)	0 (0)	0 (0)	1.7 (8.5)	0 (0)	4.5 (11.1)	1.2 (7.3)	0 (0)	0 (0)
BA_QUELAM	m^2/ha	12.0 (37.7)	34.1 (60.6)	4.6 (11.3)	60.5 (121.0)	16.4 (40.2)	3.0 (10.2)	21.9 (52.3)	**24.9** (57.6)	8.1 (21.1)	0.4 (0.8)

APPENDIX 4.3.1. Continued.

Variable[A]	Measure	All sites	Babbler b-e sh	Babbler b-h sh	Babbler g sh	Babbler p w	Babbler r-c	Babbler r-t w	Babbler sc-b w	Babbler st-b s	Barbet g
BA_QUEOXY	m^2/ha	11.5 (48.8)	39.8 (95.6)	10.9 (26.4)	0 (0)	12.7 (46.7)	1.2 (4.9)	13.9 (33.8)	15.9 (76.2)	0.5 (1.6)	4.1 (0.8)
BA_RHOARB	m^2/ha	4.6 (18.3)	20.1 (46.1)	2.8 (7.5)	2.1 (4.2)	6.1 (22.1)	0.8 (3.1)	0 (0)	5.5 (20.9)	4.3 (12.6)	0 (0)
BA_SYMRAM	m^2/ha	0.6 (3.2)	0 (0)	**0.8** (1.4)	3.1 (6.2)	0.9 (4.5)	0 (0)	0 (0)	0 (0)	0.2 (0.9)	0 (0)
BA_SYMTHE	m^2/ha	41.8 (59.9)	30.8 (12.4)	17.2 (18.4)	24.9 (25.4)	**51.7** (58.2)	44.2 (74.4)	35.4 (39.6)	**66.9** (74.2)	88.3 (108.8)	39.5 (43.0)
BA_TETFRA	m^2/ha	5.3 (21.4)	1.6 (4.0)	5.4 (14.2)	3.8 (7.6)	8.4 (36.4)	2.1 (5.7)	0 (0)	10.4 (40.3)	0.9 (2.5)	0 (0)
BA_VIBERU	m^2/ha	16.1 (26.8)	24.1 (29.2)	24.4 (30.4)	6.6 (5.6)	20.5 (31.5)	23.3 (35.2)	19.6 (22.0)	19.0 (30.4)	33.8 (37.3)	7.9 (8.4)

[A] See Appendix 4.1 for descriptions.

[B] 36 sample sites in each of seven 9-ha plots.

APPENDIX 4.3.2. Means of habitat variables at sampling sites occupied by grey-winged blackbird - grey-headed flycatcher (standard deviations in parentheses). Bold font indicates occupied sites differ from unoccupied sites at the microhabitat scale; underscore, that species abundance is correlated with a variable at the macrohabitat scale (see Table 4.1 for *P*-values). Plant species detected at <10 sample sites omitted.

Variable[A]	Measurement	All sitesв	Blackbird g-w	Bulbul stri	Bushchat g	Cuckoo E	Cuckoo l h	Drongo a	Fantail, y-b	Flowerpecker f-b	Flycatcher g-h
No. of sites:		252	14	8	32	7	9	7	12	4	4
SLOPE	%	72.8 (29.8)	46.0 (13.1)	66.5 (19.9)	56.0 (32.3)	62.1 (37.6)	57.7 (23.4)	56.1 (27.6)	76.7 (20.2)	67.5 (17.5)	89.3 (23.9)
ASPECT	- -	SW	SW	SW	SW	SW	SW	SE	W	SE	N
CANCOV	%	77.2 (31.3)	**62.5** (33.8)	88.9 (8.3)	<u>**22.9**</u> (25.5)	66.4 (42.2)	79.1 (20.9)	60.3 (36.1)	88.1 (20.0)	75.6 (19.3)	88.2 (10.5)
SD_CC	%	13.2 (13.3)	**22.3** (16.1)	16.3 (11.7)	21.1 (17.4)	12.9 (19.3)	19.5 (14.5)	**24.1** (14.7)	10.2 (12.4)	24.7 (15.8)	17.0 (12.8)
T_CV/M	m^3/m^2	7.2 (10.0)	4.2 (4.1)	10.7 (13.1)	**0.7** (1.0)	15.1 (27.9)	8.5 (13.0)	4.7 ()	10.3 (10.9)	4.5 (6.5)	7.1 (3.9)
L_CV/M	m^3/m^2	5.5 (8.5)	2.4 (2.6)	9.4 (12.7)	**0.4** (0.5)	13.9 (27.9)	7.4 (12.5)	**1.5** (2.2)	7.5 (11.1)	**0.7** (0.9)	5.4 (3.3)
M_CV/M	m^3/m^2	1.5 (5.5)	0.8 (0.7)	0.9 (0.6)	**0.2** (0.3)	0.9 (1.1)	0.7 (0.4)	1.2 (2.1)	1.6 (2.9)	0.4 (0.3)	0.9 (0.4)
S_CV/M	m^3/m^2	0.4 (0.9)	1.0 (3.1)	0.3 (0.5)	**0.1** (0.2)	0.3 (0.2)	0.3 (0.3)	2.0 (4.3)	1.3 (3.3)	3.4 (5.6)	0.9 (0.7)
L_LCAN	m	4.4 (2.8)	**2.1** (1.4)	4.2 (1.8)	**1.5** (0.7)	4.3 (2.9)	**3.7** (2.2)	**2.2** (1.2)	5.0 (2.0)	2.0 (1.2)	5.6 (4.2)
M_LCAN	m	3.0 (1.7)	**2.0** (1.6)	3.0 (1.2)	**1.1** (0.3)	2.7 (2.2)	2.7 (1.5)	**1.7** (0.7)	3.1 (1.6)	1.5 (0.7)	4.2 (2.7)
S_LCAN	m	1.8 (0.6)	1.7 (0.7)	1.9 (0.6)	1.6 (0.4)	1.9 (1.0)	1.9 (0.5)	1.9 (1.0)	1.8 (0.8)	2.3 (1.2)	1.7 (0.2)

APPENDIX 4.3.2. Continued.

Variable[A]	Measurement	All sites	Blackbird g-w	Bulbul stri	Bushchat g	Cuckoo E	Cuckoo l h	Drongo a	Fantail, y-b	Flowerpecker f-b	Flycatcher g-h
TBA/H	m^2/ha	48.3 (39.4)	50.7 (35.0)	62.0 (47.3)	**12.3** (16.2)	46.0 (41.5)	45.7 (26.0)	**23.7** (27.1)	58.0 (40.3)	34.9 (35.8)	85.3 (77.7)
VL_DENS	trees/ha	22.2 (44.3)	12.8 (32.6)	66.6 (104.2)	**0** (0)	35.6 (65.7)	31.8 (61.6)	13.1 (34.6)	30.4 (44.8)	22.9 (45.8)	11.6 (23.1)
L_DENS	trees/ha	241.6 (216.6)	232.5 (138.8)	341.2 (342.2)	**69.2** (118.6)	301.0 (291.2)	296.5 (211.0)	**112.5** (125.9)	315.4 (313.2)	110.6 (171.0)	369.5 (185.5)
M_DENS	trees/ha	439.8 (492.6)	467.6 (351.0)	559.5 (612.1)	**185.3** (289.4)	454.5 (312.3)	418.9 (203.4)	221.4 (234.2)	437.5 (450.5)	330.8 (384.0)	395.6 (444.4)
S_DENS	trees/ha	1565.6 (1681.4)	2389.5 (3100.0)	1117.4 (521.7)	**1070.2** (1978.5)	1202.4 (1157.0)	1417.1 (961.5)	3182.5 (4325.8)	2388.2 (3249.4)	6043.2 (6005.0)	2685.8 (2873.3)
VL_HT	m	19.1 (6.0)	14.0 (2.0)	18.0 (3.4)	- -	20.1 (7.7)	19.3 (0.4)	16.0 (0)	17.2 (2.0)	16.6 (0)	31.6 (0)
LG_HT	m	10.6 (4.9)	**6.9** (2.8)	11.7 (4.9)	**4.8** (2.3)	9.4 (4.9)	10.5 (3.5)	**6.3** (3.3)	12.2 (3.7)	6.2 (2.4)	11.2 (5.0)
MD_HT	m	6.8 (2.5)	**5.3** (2.0)	7.1 (2.0)	**3.7** (1.5)	5.5 (3.0)	6.5 (2.1)	6.1 (2.3)	7.2 (1.7)	4.8 (1.9)	9.6 (4.4)
SM_HT	m	3.0 (0.8)	**2.5** (0.7)	3.1 (0.7)	**2.4** (0.4)	3.0 (1.1)	3.1 (0.7)	2.6 (0.9)	3.0 (1.0)	3.2 (0.9)	3.0 (0.6)
VL_DBH	cm	79.6 (15.0)	70.8 (1.3)	72.5 (9.4)	- -	81.0 (10.4)	68.0 (1.6)	69.5 (0)	74.4 (11.9)	69.5 (0)	95.5 (0)
LG_DBH	cm	42.8 (12.0)	42.9 (7.2)	43.6 (10.4)	**34.9** (17.4)	38.9 (7.5)	**41.0** (11.1)	**30.8** (13.9)	44.2 (9.3)	37.0 (5.2)	46.9 (9.3)
MD_DBH	cm	15.7 (2.6)	16.0 (2.7)	16.2 (1.8)	**14.2** (4.4)	15.1 (2.4)	15.5 (0.7)	**17.7** (1.3)	16.3 (1.5)	15.2 (1.5)	18.2 (2.3)
SM_DBH	cm	4.5 (1.1)	4.5 (1.4)	4.4 (0.8)	4.9 (1.0)	4.3 (1.0)	4.2 (0.8)	4.3 (0.8)	4.2 (1.2)	4.7 (1.4)	4.8 (0.9)

APPENDIX 4.3.2. Continued.

Variable[A]	Measurement	All sites	Blackbird g-w	Bulbul stri	Bushchat g	Cuckoo E	Cuckoo l h	Drongo a	Fantail, y-b	Flowerpecker f-b	Flycatcher g-h
HT:DBH	m/cm	0.46 (0.12)	**0.36** (0.10)	0.47 (0.74)	**0.32** (0.06)	0.44 (0.17)	0.47 (0.09)	0.41 (0.10)	0.49 (0.09)	0.39 (0.10)	0.47 (0.15)
SRB_COV	cm	165.9 (172.3)	**286.9** (163.0)	173.8 (157.3)	236.2 (289.1)	189.7 (188.8)	214.3 (191.8)	190.0 (137.3)	110.3 (122.0)	147.6 (172.3)	212.6 (185.1)
SRB_EDG	line intercept	4.3 (4.0)	**7.1** (2.0)	4.8 (2.9)	**4.5** (4.4)	5.3 (4.3)	4.3 (3.8)	5.4 (3.7)	3.7 (1.7)	3.8 (3.5)	4.8 (4.6)
BAM_COV	cm	348.5 (639.5)	**28.6** (102.7)	122.5 (237.1)	**0** (0)	215.8 (505.9)	276.7 (492.0)	**116.3** (402.7)	238.3 (348.4)	135.0 (252.4)	105.0 (249.0)
FRN_COV	cm	774.0 (6912.4)	**262.5** (180.6)	779.4 (512.7)	**295.5** (271.6)	536.1 (623.3)	688.1 (517.0)	381.8 (313.7)	**1120.7** (806.9)	1090.6 (897.6)	**991.2** (560.2)
LOG	# /50m^2	2.4 (2.5)	1.6 (2.6)	3.0 (2.3)	**0.08** (0.3)	1.8 (3.0)	1.6 (1.8)	1.1 (1.4)	**3.7** (2.2)	2.6 (2.5)	1.4 (1.4)
BLDR	# /50m^2	2.2 (1.4)	**1.3** (1.1)	2.0 (1.4)	**0.8** (1.1)	2.0 (1.3)	2.3 (1.3)	2.0 (1.2)	2.9 (0.8)	2.5 (1.2)	2.1 (1.4)
PAST	count of quadrants	1 (1.4)	**2.5** (1.6)	0.8 (1.1)	**1.5** (1.7)	1.8 (1.9)	1.7 (1.5)	1.7 (1.9)	**0.7** (0.9)	0.4 (0.7)	0.3 (0.6)
HEDGE	m /9 ha	8.8 (27.1)	11.8 (25.6)	0 (0)	**71.9** (62.8)	**27.1** (39.7)	8.9 (16.6)	30.4 (48.8)	0 (0)	0 (0)	0 (0)
STUMP	# /50m^2	12.7 (11.1)	**23.3** (15.4)	12.5 (9.0)	12.8 (16.4)	16.5 (17.2)	17.3 (15.7)	19.0 (17.5)	9.8 (10.0)	9.5 (10.9)	6.4 (5.3)
CUT	# /100 trees	23.7 (22.7)	35.1 (24.5)	2.3 (2.5)	**45.3** (20.6)	25.0 (20.4)	2.7 (2.1)	**46.4** (15.9)	1.4 (1.6)	41.7 (23.6)	4.0 (2.5)
PATH	m /9 ha	32.5 (36.4)	**72.8** (45.9)	30.3 (30.6)	**64.2** (39.2)	32.9 (33.8)	41.8 (36.8)	**46.8** (44.4)	32.3 (42.4)	36.5 (45.5)	28.5 (41.7)
SP_RICH	# /12 trees	5.7 (1.8)	5.3 (1.4)	6.5 (1.7)	**4.5** (1.3)	5.7 (1.8)	5.0 (1.6)	5.4 (2.0)	5.8 (1.7)	5.3 (1.3)	5.0 (0.7)

APPENDIX 4.3.2. Continued.

Variable[A]	Measurement	All sites	Blackbird g-w	Bulbul stri	Bushchat g	Cuckoo E	Cuckoo l h	Drongo a	Fantail, y-b	Flowerpecker f-b	Flycatcher g-h
FAGACEA	# /100 trees	4.3 (6.6)	1.2 (3.0)	7.3 (9.4)	**0.3** (1.5)	3.6 (4.5)	2.8 (5.9)	2.4 (6.3)	2.8 (5.4)	0 (0)	10.4 (10.5)
ERICACEA	# /100 trees	8.3 (14.8)	8.3 (13.5)	12.5 (23.6)	4.7 (7.0)	1.2 (3.2)	7.4 (9.7)	4.8 (8.1)	1.4 (3.2)	0 (0)	0 (0)
LAURACEA	# /100 trees	9.7 (14.3)	3.6 (6.3)	5.2 (9.9)	**0** (0)	7.1 (12.2)	6.5 (16.6)	3.6 (6.6)	**18.8** (17.5)	4.17 (8.3)	8.3 (6.8)
THEACEA	# /100 trees	32.2 (21.0)	41.7 (16.7)	34.4 (19.6)	**20.1** (20.9)	23.8 (18.3)	42.6 (19.7)	38.1 (28.4)	41.7 (17.8)	41.7 (30.4)	45.8 (25.0)
BA_ACECAM	m^2/ha	4.4 (28.8)	0 (0)	0 (0)	**0** (0)	10.3 (24.1)	0 (0)	0 (0)	2.2 (7.5)	0 (0)	0 (0)
BA_ALACHI	m^2/ha	0.6 (5.4)	1.0 (3.6)	0 (0)	0 (0)	3.8 (10.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
BA_ALNNEP	m^2/ha	0.7 (4.6)	1.4 (5.1)	0 (0)	**1.3** (3.6)	**6.1** (15.8)	0 (0)	**4.4** (7.6)	0 (0)	0 (0)	0 (0)
BA_BERARI	m^2/ha	10.4 (31.1)	**44.8** (65.1)	17.5 (42.2)	**22.6** (46.3)	33.5 (83.3)	24.8 (74.0)	5.6 (14.7)	0.8 (2.9)	3.7 (4.3)	1.2 (1.1)
BA_CASHYS	m^2/ha	0.2 (2.9)	3.3 (12.4)	0 (0)	0.06 (0.3)	0 (0)	0 (0)	0.9 (2.5)	0 (0)	0 (0)	**0.5** (1.1)
BA_DAPBHO	m^2/ha	0.1 (0.6)	0.4 (1.1)	0.2 (0.4)	**0** (0)	0.1 (0.3)	0 (0)	0.08 (0.2)	0.07 (0.2)	0.2 (0.3)	0 (0)
BA_EURACU	m^2/ha	16.1 (39.6)	80.3 (114.3)	9.4 (14.3)	10.3 (28.8)	18.3 (45.0)	9.8 (9.7)	20.8 (33.8)	3.2 (6.6)	47.2 (71.7)	12.8 (25.6)
BA_FICNER	m^2/ha	1.7 (6.9)	0.09 (0.2)	0 (0)	0.9 (2.2)	2.4 (4.3)	1.2 (3.6)	0.6 (1.6)	0 (0)	1.0 (2.1)	4.7 (9.4)
BA_HYDHET	m^2/ha	1.6 (5.4)	1.2 (4.2)	**6.4** (6.8)	0.04 (0.2)	0 (0)	**5.0** (7.1)	0 (0)	1.8 (3.7)	0 (0)	9.4 (18.8)

APPENDIX 4.3.2. Continued.

Variable[A]	Measurement	All sites	Blackbird g-w	Bulbul stri	Bushchat g	Cuckoo E	Cuckoo l h	Drongo a	Fantail, y-b	Flowerpecker f-b	Flycatcher g-h
BA_ILESIK	m^2/ha	3.1 (22.6)	0 (0)	0 (0)	0 (0)	0.09 (0.2)	0 (0)	0 (0)	**30.7** (96.5)	0 (0)	0 (0)
BA_LINASS	m^2/ha	1.5 (9.4)	0 (0)	0 (0)	0 (0)	2.1 (5.5)	0 (0)	0 (0)	6.9 (23.8)	0 (0)	0 (0)
BA_LINPUL	m^2/ha	10.0 (83.6)	0 (0)	0.7 (2.0)	0 (0)	6.3 (16.6)	5.2 (15.7)	0 (0)	5.1 (13.6)	0 (0)	31.2 (62.5)
BA_LITELO	m^2/ha	8.6 (24.5)	5.0 (13.2)	20.5 (41.8)	**0.1** (0.8)	2.5 (6.5)	3.0 (6.7)	5.0 (7.9)	**28.3** (65.1)	5.3 (10.5)	31.2 (62.5)
BA_LYOOVA	m^2/ha	27.7 (92.0)	21.4 (56.3)	20.6 (58.3)	1.2 (2.6)	0.2 (0.5)	10.5 (17.8)	0.7 (1.9)	0.2 (0.7)	0 (0)	0 (0)
BA_MAGCAM	m^2/ha	2.3 (20.3)	0 (0)	0 (0)	0.2 (0.9)	0 (0)	**29.0** (65.4)	0 (0)	16.1 (55.6)	**1.2** (2.5)	0 (0)
BA_MELPIN	m^2/ha	3.0 (12.7)	0 (0)	0.3 (0.7)	0.6 (3.5)	2.8 (6.3)	0 (0)	0 (0)	2.4 (8.1)	0 (0)	0 (0)
BA_MICKIS	m^2/ha	3.6 (22.8)	1.4 (5.4)	0.4 (1.2)	0 (0)	2.9 (7.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
BA_MYRSEM	m^2/ha	0.9 (6.3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3.8 (13.2)	0 (0)	0 (0)
BA_PERCLA	m^2/ha	20.4 (45.7)	9.9 (37.1)	8.0 (15.8)	**0** (0)	11.2 (29.7)	0.04 (0.1)	19.8 (52.5)	29.3 (43.5)	34.7 (69.5)	5.3 (10.5)
BA_PERDUT	m^2/ha	3.2 (40.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	**156.8** (313.5)
BA_PRUVEN	m^2/ha	2.1 (14.6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
BA_QUELAM	m^2/ha	12.0 (37.7)	**0** (0)	30.3 (62.4)	**0** (0)	6.0 (15.2)	0 (0)	1.6 (4.2)	9.1 (25.4)	0 (0)	33.1 (66.3)

APPENDIX 4.3.2. Continued.

Variable[A]	Measurement	All sites	Blackbird g-w	Bulbul stri	Bushchat g	Cuckoo E	Cuckoo l h	Drongo a	Fantail, y-b	Flowerpecker f-b	Flycatcher g-h
BA_QUEOXY	m^2/ha	11.5 (48.8)	2.7 (10.1)	25.7 (72.7)	**0** (0)	67.5 (178.6)	46.9 (102.5)	0 (0)	0.07 (0.2)	0 (0)	17.6 (35.3)
BA_RHOARB	m^2/ha	4.6 (18.3)	0 (0)	16.5 (46.8)	0.3 (1.8)	0 (0)	2.0 (4.3)	1.1 (2.9)	1.0 (3.6)	0 (0)	0 (0)
BA_SYMRAM	m^2/ha	0.6 (3.2)	0 (0)	**0.4** (1.1)	**1.8** (5.7)	0 (0)	0 (0)	2.2 (5.9)	0 (0)	0 (0)	0.5 (1.0)
BA_SYMTHE	m^2/ha	41.8 (59.9)	38.5 (42.5)	30.7 (35.6)	**9.9** (27.6)	0 (0)	55.1 (53.3)	35.5 (57.6)	75.6 (97.8)	61.0 (70.7)	107.0 (99.4)
BA_TETFRA	m^2/ha	5.3 (21.4)	0 (0)	4.7 (13.3)	**0.04** (0.2)	0 (0)	0 (0)	0 (0)	28.1 (74.2)	0 (0)	0 (0)
BA_VIBERU	m^2/ha	16.1 (26.8)	12.4 (25.7)	35.9 (55.6)	**6.1** (14.7)	12.1 (12.3)	13.7 (14.1)	12.0 (12.9)	18.7 (36.7)	32.6 (31.3)	22.7 (35.7)

[A] See Appendix 4.1 for descriptions.

[B] 36 sample sites in each of seven 9-ha plots.

APPENDIX 4.3.3. Means of habitat variables at sampling sites occupied by pygmy blue flycatcher - striated laughingthrush (standard deviations in parentheses). Bold font indicates occupied sites differ from unoccupied sites at the microhabitat scale; underscore, that species abundance is correlated with a variable at the macrohabitat scale (see Table 4.1 for *P*-values). Plant species detected at <10 sample sites omitted.

Variable[A]	Measurement	All sites[B]	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Flycatcher v	Fulveta r-w	Fulveta w-b	Laughingthrush c-c	Laughingthrush strkd
No. of sites:		252	17	16	25	5	16	61	14	89	9
SLOPE	%	72.8 (29.8)	82.6 (14.6)	65.6 (17.1)	**82.3** (20.7)	81.2 (31.9)	51.3 (23.6)	77.6 (30.1)	78.9 (18.0)	71.5 (28.9)	75.2 (33.9)
ASPECT	- -	SW	SW	SW	W	NE	SE	SW	SW	SW	SE
CANCOV	%	77.2 (31.3)	95.5 (3.1)	82.0 (25.8)	**93.4** (12.0)	96.5 (3.0)	<u>**46.8**</u> (35.2)	84.2 (21.3)	74.0 (24.0)	77.3 (28.6)	**41.0** (48.9)
SD_CC	%	13.2 (13.3)	7.3 (5.6)	13.2 (10.9)	8.4 (10.2)	7.2 (4.8)	**23.7** (15.9)	14.6 (13.6)	**20.4** (13.3)	**16.0** (14.1)	**6.2** (10.1)
T_CV/M	m^3/m^2	7.2 (10.0)	<u>8.8</u> (7.8)	8.4 (7.3)	**7.8** (4.8)	6.3 (1.0)	<u>**3.0**</u> (3.8)	7.6 (12.1)	**3.4** (3.1)	7.1 (11.2)	5.6 (8.2)
L_CV/M	m^3/m^2	5.5 (8.5)	6.9 (8.0)	6.6 (7.6)	**5.5** (5.0)	3.9 (0.7)	<u>**2.1**</u> (3.3)	4.5 (6.1)	2.4 (2.7)	4.6 (6.9)	**3.3** (6.8)
M_CV/M	m^3/m^2	1.5 (5.5)	1.6 (2.1)	1.7 (2.2)	**1.9** (2.0)	1.6 (1.1)	**0.7** (1.2)	2.7 (10.8)	0.7 (0.5)	2.2 (9.0)	1.8 (3.4)
S_CV/M	m^3/m^2	0.4 (0.9)	0.3 (0.3)	0.2 (0.2)	0.4 (0.4)	**0.9** (0.4)	**0.2** (0.2)	0.4 (0.5)	0.3 (0.2)	0.3 (0.4)	0.4 (0.7)
L_LCAN	m	4.4 (2.8)	5.0 (1.8)	5.0 (1.9)	5.2 (2.2)	**6.8** (0.8)	**2.1** (1.1)	4.1 (2.6)	3.0 (1.8)	4.1 (2.6)	4.5 (2.4)
M_LCAN	m	3.0 (1.7)	<u>**3.8**</u> (1.5)	3.7 (1.7)	**3.7** (1.6)	4.4 (1.3)	**1.5** (0.9)	2.9 (1.6)	**2.0** (1.0)	2.9 (1.6)	2.7 (1.8)

APPENDIX 4.3.3. Continued.

Variable[A]	Measurement	All sites[B]	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Flycatcher v	Fulveta r-w	Fulveta w-b	Laughingthrush c-c	Laughingthrush strkd
S_LCAN	m	1.8 (0.6)	1.7 (0.4)	1.5 (0.4)	1.7 (0.5)	1.9 (0.3)	1.6 (0.3)	1.7 (0.4)	1.8 (0.4)	**1.7** (0.5)	1.8 (0.6)
TBA/H	m^2/ha	48.3 (39.4)	45.7 (24.1)	47.1 (22.7)	58.5 (42.8)	48.2 (9.5)	**29.9** (27.4)	**58.5** (42.8)	35.8 (19.8)	50.9 (43.3)	**26.1** (32.8)
VL_DENS	trees/ha	22.2 (44.3)	26.8 (40.4)	27.6 (39.9)	24.5 (45.9)	16.8 (20.7)	4.2 (13.0)	20.1 (44.1)	11.0 (19.5)	22.5 (42.6)	9.0 (27.1)
L_DENS	trees/ha	241.6 (216.6)	224.5 (103.8)	228.3 (95.5)	**337.3** (278.3)	312.7 (174.0)	189.7 (191.4)	**303.8** (259.5)	199.7 (117.4)	247.2 (235.5)	**94.9** (133.0)
M_DENS	trees/ha	439.8 (492.6)	452.0 (365.8)	421.1 (316.6)	543.8 (456.2)	460.7 (198.7)	351.6 (351.8)	**610.3** (735.8)	375.1 (251.9)	511.0 (665.7)	**662.0** (1672.3)
S_DENS	trees/ha	1565.6 (1681.4)	1478.9 (925.1)	1155.0 (618.1)	1742.7 (1974.5)	**2222.0** (722.7)	1330.1 (1205.5)	1679.3 (1443.0)	1158.4 (578.1)	1774.5 (1853.2)	**1189.0** (2352.9)
VL_HT	m	19.1 (6.0)	21.1 (10.7)	19.8 (11.7)	17.0 (3.2)	18.2 (1.1)	17.3 (1.7)	19.9 (5.7)	18.1 (3.9)	1774.5 (1863.7)	18.2 (6.0)
LG_HT	m	10.6 (4.9)	**12.7** (3.6)	12.2 (3.9)	**12.4** (3.6)	13.3 (2.2)	**6.7** (2.6)	10.2 (4.3)	9.1 (3.3)	10.2 (4.8)	9.5 (6.6)
MD_HT	m	6.8 (2.5)	**8.0** (2.1)	7.7 (2.1)	**7.8** (2.0)	8.6 (1.0)	**4.8** (1.9)	6.8 (2.4)	6.1 (1.5)	6.8 (2.3)	6.1 (4.1)
SM_HT	m	3.0 (0.8)	2.8 (0.5)	2.8 (0.6)	3.1 (0.9)	**3.8** (0.6)	**2.4** (0.5)	2.9 (0.8)	2.8 (0.8)	2.8 (0.7)	2.9 (0.8)
VL_DBH	cm	79.6 (15.0)	80.9 (39.4)	79.6 (40.7)	72.7 (7.4)	83.3 (6.8)	64.0 (2.0)	76.9 (13.0)	79.1 (19.7)	77.5 (14.5)	76.5 (14.6)
LG_DBH	cm	42.8 (12.0)	42.4 (11.4)	43.8 (11.5)	42.7 (8.0)	42.2 (11.3)	38.5 (5.8)	43.2 (10.2)	42.3 (13.1)	43.7 (11.5)	40.3 (20.1)

APPENDIX 4.3.3. Continued.

Variable[A]	Measurement	All sites[B]	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Flycatcher v	Fulveta r-w	Fulveta w-b	Laughingthrush c-c	Laughingthrush strkd
MD_DBH	cm	15.7 (2.6)	15.9 (3.1)	16.4 (3.0)	16.4 (2.6)	16.0 (1.4)	15.2 (2.4)	15.9 (2.1)	15.5 (1.6)	15.8 (2.3)	14.2 (5.7)
SM_DBH	cm	4.5 (1.1)	4.1 (1.0)	4.4 (1.0)	4.2 (1.2)	5.1 (0.8)	4.6 (1.4)	**4.3** (1.1)	4.2 (1.3)	4.5 (1.0)	5.0 (0.7)
HT:DBH	m/cm	0.46 (0.12)	0.51 (0.09)	0.47 (0.08)	**0.52** (0.74)	0.55 (0.10)	**0.35** (0.09)	0.45 (0.09)	0.44 (0.08)	0.44 (0.11)	0.44 (0.15)
SRB_COV	cm	165.9 (172.3)	122.7 (96.2)	155.1 (128.6)	**81.6** (80.6)	**29.6** (30.9)	**225.0** (160.4)	177.4 (138.9)	143.4 (157.9)	**191.3** (177.5)	106.0 (150.6)
SRB_EDG	line intercept	4.3 (4.0)	2.8 (2.6)	**6.1** (3.1)	2.9 (2.9)	**1.2** (1.6)	5.6 (3.5)	4.8 (3.6)	**6.4** (2.6)	**5.0** (3.8)	3.6 (2.3)
BAM_COV	cm	348.5 (639.5)	239.9 (409.4)	89.7 (271.8)	**404.8** (466.9)	315.0 (462.4)	**99.7** (392.1)	255.4 (442.3)	200.0 (339.6)	301.2 (552.2)	93.3 (280.0)
FRN_COV	cm	774.0 (6912.4)	904.3 (651.3)	912.1 (726.3)	963.2 (757.1)	**1910.6** (487.5)	**478.4** (577.4)	725.9 (598.5)	757.6 (511.5)	687.9 (655.9)	712.2 (150.6)
LOG	# /50m^2	2.4 (2.5)	3.0 (1.9)	**4.1** (2.8)	3.0 (2.7)	**5.0** (1.7)	**1.3** (3.0)	2.0 (1.9)	1.8 (1.5)	2.2 (2.2)	**0.9** (1.4)
BLDR	# /50m^2	2.2 (1.4)	2.4 (1.3)	2.3 (1.2)	**2.9** (1.2)	2.6 (1.5)	1.6 (1.2)	2.2 (1.3)	2.0 (1.5)	2.1 (1.4)	**0.7** (1.4)
PAST	count of quadrants	1 (1.4)	0.5 (0.8)	1.4 (1.6)	0.6 (0.9)	0.4 (0.8)	**2.8** (1.5)	1.1 (1.4)	1.1 (1.3)	**1.4** (1.6)	10 (1.4)
HEDGE	m /9 ha	8.8 (27.1)	0 (0)	5.6 (15.0)	2.0 (9.8)	0 (0)	**37.2** (41.5)	3.0 (11.0)	6.1 (13.9)	9.3 (30.3)	**68.9** (78.5)
STUMP	# /50m^2	12.7 (11.1)	13.2 (10.9)	**16.9** (8.5)	12.8 (8.8)	6.8 (1.7)	15.0 (13.2)	**15.0** (11.0)	16.8 (15.6)	**14.8** (11.6)	**4.0** (5.6)

APPENDIX 4.3.3. Continued.

Variable[A]	Measurement	All sites[B]	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Flycatcher v	Fulveta r-w	Fulveta w-b	Laughingthrush c-c	Laughingthrush strkd
CUT	# /100 trees	23.7 (22.7)	17.6 (17.6)	15.1 (13.6)	**10.7** (9.6)	11.7 (12.5)	**41.7** (25.6)	23.0 (22.3)	28.0 (26.1)	23.7 (22.6)	28.7 (25.7)
PATH	m /9 ha	32.5 (36.4)	19.9 (24.5)	32.8 (40.9)	**17.9** (26.2)	6.6 (13.2)	**53.1** (34.5)	36.6 (32.5)	41.2 (36.6)	**38.5** (36.1)	44.4 (32.2)
SP_RICH	# /12 trees	5.7 (1.8)	6.1 (1.5)	5.9 (1.0)	5.8 (1.7)	**7.2** (1.0)	**4.6** (0.8)	5.5 (1.6)	5.6 (1.8)	5.7 (1.6)	5.3 (2.3)
FAGACEA	# /100 trees	4.3 (6.6)	**7.8** (7.5)	5.2 (5.2)	6.3 (6.9)	6.7 (7.0)	**0.5** (2.1)	3.3 (4.9)	1.8 (3.6)	3.3 (5.6)	7.4 (11.4)
ERICACEA	# /100 trees	8.3 (14.8)	5.9 (12.2)	4.2 (9.1)	9.0 (15.4)	0 (0)	4.2 (6.8)	9.6 (18.0)	13.1 (24.4)	8.9 (15.1)	0.9 (2.8)
LAURACEA	# /100 trees	9.7 (14.3)	9.3 (7.7)	10.4 (11.6)	12.3 (17.7)	8.3 (5.9)	**2.6** (7.3)	9.4 (15.4)	11.3 (17.8)	9.9 (16.7)	4.6 (7.4)
THEACEA	# /100 trees	32.2 (21.0)	39.7 (19.4)	**47.4** (14.5)	**41.7** (22.6)	33.3 (20.4)	31.8 (23.2)	35.0 (21.3)	35.1 (18.3)	33.8 (20.8)	**16.7** (21.2)
BA_ACECAM	m^2/ha	4.4 (28.8)	0 (0)	0.2 (0.6)	2.6 (7.6)	0 (0)	26.9 (107.6)	2.1 (7.0)	1.9 (6.9)	1.8 (7.5)	3.9 (11.6)
BA_ALACHI	m^2/ha	0.6 (5.4)	0 (0)	0 (0)	3.0 (15.0)	**3.2** (6.4)	0.9 (3.4)	1.7 (10.4)	0 (0)	1.3 (8.7)	0 (0)
BA_ALNNEP	m^2/ha	0.7 (4.6)	0 (0)	0 (0)	0 (0)	0 (0)	1.0 (4.2)	0.7 (5.4)	1.0 (3.8)	1.4 (7.1)	**0.2** (0.4)
BA_BERARI	m^2/ha	10.4 (31.1)	1.2 (2.4)	0.2 (0.6)	0.4 (1.5)	0 (0)	**4.1** (14.3)	19.5 (46.4)	6.4 (15.4)	14.5 (40.2)	0.1 (0.3)
BA_CASHYS	m^2/ha	0.2 (2.9)	0.5 (1.1)	0 (0)	0 (0)	0 (0)	0.6 (1.7)	0.8 (5.9)	0 (0)	0.1 (0.7)	0 (0)

APPENDIX 4.3.3. Continued.

Variable[A]	Measurement	All sites[B]	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Flycatcher v	Fulveta r-w	Fulveta w-b	Laughingthrush c-c	Laughingthrush strkd
BA_DAPBHO	m^2/ha	0.1 (0.6)	0 (0)	0.02 (0.05)	0.04 (0.1)	0 (0)	0.1 (0.2)	0.1 (0.4)	0.2 (0.6)	0.1 (0.5)	0 (0)
BA_EURACU	m^2/ha	16.1 (39.6)	12.8 (25.6)	28.7 (55.3)	11.4 (25.4)	48.5 (56.8)	13.9 (24.4)	24.4 (59.3)	5.4 (7.4)	24.0 (45.7)	9.1 (25.3)
BA_FICNER	m^2/ha	1.7 (6.9)	4.7 (9.4)	**0** (0)	11.4 (1.8)	4.5 (9.0)	0.02 (0.08)	1.2 (3.6)	0.06 (0.2)	0.9 (2.6)	3.7 (7.7)
BA_HYDHET	m^2/ha	1.6 (5.4)	9.4 (18.8)	2.4 (5.6)	1.1 (3.1)	5.6 (11.1)	2.3 (9.4)	2.1 (6.0)	1.2 (3.2)	1.9 (5.6)	**0.02** (0.07)
BA_ILESIK	m^2/ha	3.1 (22.6)	**0** (0)	**4.1** (8.4)	**21.2** (66.9)	0 (0)	0.4 (1.5)	7.7 (43.7)	0.3 (1.0)	2.4 (9.3)	0 (0)
BA_LINASS	m^2/ha	1.5 (9.4)	0 (0)	2.4 (9.4)	3.7 (18.1)	0 (0)	0.2 (0.8)	3.2 (15.8)	5.9 (22.0)	1.4 (9.9)	0 (0)
BA_LINPUL	m^2/ha	10.0 (83.6)	0 (0)	1.5 (3.8)	6.6 (22.7)	0 (0)	28.4 (104.4)	2.1 (8.3)	3.5 (12.6)	3.6 (16.4)	0 (0)
BA_LITELO	m^2/ha	8.6 (24.5)	31.2 (62.5)	13.9 (28.8)	18.3 (29.9)	2.7 (4.6)	2.9 (6.3)	4.2 (13.3)	3.6 (7.1)	8.9 (30.3)	14.6 (41.4)
BA_LYOOVA	m^2/ha	27.7 (92.0)	0 (0)	9.7 (23.6)	36.7 (93.8)	0 (0)	36.5 (90.1)	34.7 (90.4)	24.4 (71.1)	32.2 (117.1)	10.0 (30.0)
BA_MAGCAM	m^2/ha	2.3 (20.3)	0 (0)	**19.7** (60.9)	0 (0)	0 (0)	0 (0)	3.2 (24.7)	13.8 (51.5)	0 (0)	0 (0)
BA_MELPIN	m^2/ha	3.0 (12.7)	0 (0)	1.1 (4.4)	1.2 (5.2)	**6.3** (7.7)	2.2 (5.5)	1.8 (7.8)	0 (0)	1.9 (7.4)	0.7 (2.1)
BA_MICKIS	m^2/ha	3.6 (22.8)	0 (0)	0 (0)	0 (0)	4.1 (8.2)	3.7 (14.7)	1.4 (10.1)	0 (0)	4.8 (28.0)	0 (0)

APPENDIX 4.3.3. Continued.

Variable[A]	Measurement	All sites[B]	Flycatcher p b	Flycatcher r-g	Flycatcher sl-b	Flycatcher sn-b	Flycatcher v	Fulveta r-w	Fulveta w-b	Laughingthrush c-c	Laughingthrush strkd
BA_MYRSEM	m^2/ha	0.9 (6.3)	0 (0)	0 (0)	5.2 (17.6)	0 (0)	1.7 (6.9)	0.5 (2.6)	0.3 (0.9)	1.6 (9.0)	0 (0)
BA_PERCLA	m^2/ha	20.4 (45.7)	5.3 (10.5)	18.8 (33.0)	20.9 (46.6)	15.9 (14.0)	**23.5** (55.1)	17.0 (36.3)	13.3 (24.7)	19.7 (39.1)	4.9 (9.8)
BA_PERDUT	m^2/ha	3.2 (40.0)	156.8 (313.5)	0 (0)	0 (0)	0 (0)	41.9 (156.4)	10.4 (80.3)	0 (0)	8.1 (67.0)	0 (0)
BA_PRUVEN	m^2/ha	2.1 (14.6)	0 (0)	1.7 (6.6)	3.1 (10.9)	8.5 (17.1)	0 (0)	0.08 (0.6)	0.3 (1.3)	2.8 (21.1)	1.0 (3.0)
BA_QUELAM	m^2/ha	12.0 (37.7)	**33.1** (66.3)	28.5 (54.0)	**14.0** (41.6)	20.3 (39.9)	**8.1** (21.1)	13.7 (37.1)	0.9 (3.3)	7.0 (22.3)	4.1 (10.5)
BA_QUEOXY	m^2/ha	11.5 (48.8)	17.6 (35.3)	11.6 (32.5)	**11.8** (28.7)	10.0 (20.1)	0.5 (1.6)	5.8 (31.1)	16.8 (62.8)	8.7 (35.6)	30.7 (69.6)
BA_RHOARB	m^2/ha	4.6 (18.3)	0 (0)	0 (0)	10.2 (27.9)	0 (0)	4.3 (12.6)	6.8 (24.5)	2.8 (4.8)	6.3 (23.9)	0 (0)
BA_SYMRAM	m^2/ha	0.6 (3.2)	0.5 (1.0)	1.7 (6.5)	1.1 (5.3)	2.5 (5.0)	0.2 (0.9)	0.4 (3.4)	1.9 (7.2)	0.8 (3.9)	0.6 (1.2)
BA_SYMTHE	m^2/ha	41.8 (59.9)	107.0 (99.4)	41.4 (28.2)	57.4 (65.9)	39.9 (34.9)	88.3 (108.8)	**56.9** (72.8)	31.8 (39.7)	42.7 (61.5)	**10.1** (24.2)
BA_TETFRA	m^2/ha	5.3 (21.4)	0 (0)	1.3 (3.0)	16.0 (52.3)	**23.1** (32.4)	0.9 (2.5)	2.9 (12.2)	9.7 (23.4)	**2.3** (12.0)	0.8 (1.9)
BA_VIBERU	m^2/ha	16.1 (26.8)	22.7 (35.7)	16.2 (25.2)	10.9 (17.8)	17.4 (5.0)	33.8 (37.3)	**23.4** (33.6)	14.4 (14.6)	15.8 (24.2)	14.2 (37.6)

[A] See Appendix 4.1 for descriptions. [B] 36 sample sites in each of seven 9-ha plots.

APPENDIX 4.3.4. Means of habitat variables at sampling sites occupied by streaked laughingthrush - Indian blue robin (standard deviations in parentheses). Bold font indicates occupied sites differ from unoccupied sites at the microhabitat scale; underscore, that species abundance is correlated with a variable at the macrohabitat scale (see Table 4.1 for *P*-values). Plant species detected at <10 sample sites omitted.

Variable[A]	Measurement	All sites	Laughingthrush stri	Minla b-w	Minla c-t	Niltava r-b	Nuthatch w-t	Partridge h	Pheasant N k	Pipit o-b	Robin I b
No. of sites:		252	10	6	15	83	6	36	4	19	78
SLOPE	%	72.8 (29.8)	**92.5** (22.7)	77.8 (20.7)	74.1 (30.0)	74.9 (27.3)	68.0 (14.5)	**81.8** (25.1)	49.0 (15.7)	**54.2** (30.6)	**58.0** (27.1)
ASPECT	- -	SW	SW	SW	SW	SW	SW	**NW**	SW	**SE**	SW
CANCOV	%	77.2 (31.3)	87.2 (28.0)	74.5 (23.1)	85.7 (24.2)	**87.9** (18.4)	90.0 (14.2)	**93.6** (13.5)	57.9 (32.8)	**22.0** (28.0)	**66.8** (29.4)
SD_CC	%	13.2 (13.3)	5.9 (8.6)	22.0 (18.2)	9.1 (8.7)	11.6 (10.8)	10.0 (10.3)	**8.1** (10.7)	25.6 (15.1)	16.1 (17.6)	**22.8** (13.9)
T_CV/M	m^3/m^2	7.2 (10.0)	8.9 (11.4)	8.9 (9.6)	13.0 (15.4)	**8.1** (10.9)	7.8 (7.5)	**11.5** (14.3)	1.9 (1.4)	**1.2** (1.8)	**4.1** (5.0)
L_CV/M	m^3/m^2	5.5 (8.5)	7.9 (11.2)	7.4 (9.2)	11.8 (15.5)	**5.2** (6.1)	6.5 (7.9)	**9.7** (14.3)	1.3 (1.3)	**0.6** (0.7)	**2.7** (4.6)
M_CV/M	m^3/m^2	1.5 (5.5)	0.7 (0.3)	1.2 (1.3)	0.9 (1.1)	2.3 (9.2)	1.0 (0.8)	1.4 (1.6)	0.5 (0.3)	**0.5** (1.1)	**1.0** (1.6)
S_CV/M	m^3/m^2	0.4 (0.9)	0.3 (0.3)	0.2 (0.2)	0.3 (0.5)	0.5 (1.4)	0.3 (0.3)	**0.4** (0.4)	0.1 (0.0)	**0.1** (0.2)	0.4 (0.5)
L_LCAN	m	4.4 (2.8)	6.3 (3.0)	3.7 (1.7)	**5.7** (2.2)	4.8 (2.6)	5.8 (1.7)	**6.3** (2.4)	**1.9** (1.6)	**1.5** (0.7)	2.3 (1.6)
M_LCAN	m	3.0 (1.7)	3.7 (1.4)	3.0 (1.6)	3.6 (1.7)	**3.3** (1.6)	**4.6** (1.6)	**4.3** (1.4)	2.0 (1.7)	**1.1** (0.5)	**1.8** (1.2)

APPENDIX 4.3.4. Continued.

Variable[A]	Measurement	All sites	Laughingthrush stri	Minla b-w	Minla c-t	Niltava r-b	Nuthatch w-t	Partridge h	Pheasant N k	Pipit o-b	Robin I b
S_LCAN	m	1.8 (0.6)	1.7 (0.5)	1.5 (0.3)	1.7 (0.5)	1.8 (0.6)	1.6 (0.4)	1.9 (0.6)	1.7 (0.3)	1.7 (0.4)	1.7 (0.4)
TBA/H	m^2/ha	48.3 (39.4)	41.3 (35.5)	46.6 (25.4)	54.1 (46.2)	**56.6** (42.6)	55.5 (43.5)	50.3 (35.0)	64.1 (81.6)	**20.7** (22.1)	49.8 (46.3)
VL_DENS	trees/ha	22.2 (44.3)	**52.2** (79.9)	42.8 (61.7)	34.7 (76.8)	25.7 (49.5)	14.5 (22.5)	**39.6** (54.1)	0 (0)	**0.4** (1.7)	**9.1** (26.4)
L_DENS	trees/ha	241.6 (216.6)	153.3 (148.7)	250.5 (177.4)	321.0 (354.0)	**280.5** (224.5)	358.5 (375.6)	234.6 (187.9)	370.8 (523.7)	**123.4** (155.8)	261.0 (234.4)
M_DENS	trees/ha	439.8 (492.6)	347.6 (157.9)	299.8 (175.8)	362.2 (410.0)	470.2 (426.1)	349.5 (228.4)	349.1 (320.0)	386.9 (249.7)	**267.7** (335.4)	493.0 (645.3)
S_DENS	trees/ha	1565.6 (1681.4)	1421.8 (1303.4)	1690.4 (1085.1)	950.6 (550.8)	1555.2 (1520.3)	1571.7 (945.0)	1210.0 (637.9)	992.8 (448.1)	**944.3** (1128.7)	**1968.9** (1748.8)
VL_HT	m	19.1 (6.0)	18.2 (6.4)	17.6 (4.9)	22.0 (6.8)	19.9 (6.6)	19.6 (2.8)	19.4 (5.2)	- -	6.4 (0)	**15.5** (3.5)
LG_HT	m	10.6 (4.9)	**13.9** (5.0)	10.0 (2.9)	**13.6** (4.1)	**11.8** (4.1)	13.4 (2.8)	**13.9** (3.9)	6.7 (4.1)	4.8 (2.2)	**7.2** (3.1)
MD_HT	m	6.8 (2.5)	7.3 (1.7)	6.7 (2.2)	7.5 (1.9)	**7.4** (2.2)	**8.9** (1.8)	**8.5** (2.0)	5.2 (2.0)	4.0 (1.0)	**5.3** (2.0)
SM_HT	m	3.0 (0.8)	3.0 (0.7)	2.9 (0.7)	2.8 (0.8)	3.0 (0.8)	2.9 (0.7)	**3.4** (0.9)	2.6 (0.2)	2.4 (0.3)	**2.6** (0.6)
VL_DBH	cm	79.6 (15.0)	78.0 (15.0)	76.2 (13.9)	87.1 (11.1)	79.3 (13.9)	67.8 (4.3)	85.7 (17.2)	- -	69.0 (0)	75.7 (18.8)
LG_DBH	cm	42.8 (12.0)	47.8 (11.1)	44.8 (7.7)	43.8 (9.8)	44.5 (10.5)	41.3 (3.8)	**48.0** (13.4)	41.8 (6.6)	36.2 (15.0)	**40.8** (8.20

APPENDIX 4.3.4 Continued.

Variable[A]	Measurement	All sites	Laughingthrush stri	Minla b-w	Minla c-t	Niltava r-b	Nuthatch w-t	Partridge h	Pheasant N k	Pipit o-b	Robin I b
MD_DBH	cm	15.7 (2.6)	**14.7** (2.4)	16.6 (1.1)	16.1 (1.7)	16.0 (1.80	**17.4** (1.2)	15.6 (2.0)	15.0 (1.6)	15.9 (3.0)	15.5 (2.1)
SM_DBH	cm	4.5 (1.1)	4.2 (1.1)	4.4 (0.9)	4.5 (1.0)	4.4 (1.1)	4.2 (1.1)	4.6 (1.1)	5.0 (0.5)	4.7 (0.9)	4.5 (1.0)
HT:DBH	m/cm	0.46 (0.12)	0.52 (0.11)	0.43 (0.05)	0.48 (0.11)	0.48 (0.10)	0.51 (0.05)	**0.54** (0.10)	0.36 (0.13)	**0.30** (0.06)	**0.38** (0.10)
SRB_COV	cm	165.9 (172.3)	97.3 (90.3)	108.3 (96.1)	137.5 (106.0)	369.7 (686.7)	131.3 (95.9)	**74.3** (76.6)	258.0 (206.7)	173.6 (171.6)	**260.9** (216.5)
SRB_EDG	line intercept	4.3 (4.0)	**1.9** (2.8)	5.2 (2.5)	4.3 (4.2)	4.3 (3.5)	2.7 (2.3)	**2.0** (2.5)	**10.5** (5.4)	**6.4** (3.7)	**7.2** (4.1)
BAM_COV	cm	348.5 (639.5)	514.4 (498.5)	335.8 (550.2)	216.7 (427.7)	369.7 (686.7)	117.5 (141.8)	**824.4** (794.5)	0 (0)	**0** (0)	**39.6** (180.5)
FRN_COV	cm	774.0 (6912.4)	990.0 (991.9)	632.3 (499.1)	**1238.5** (919.3)	835.6 (689.3)	1269.8 (807.8)	**920.9** (599.4)	276.0 (255.4)	**148.9** (98.6)	**506.9** (554.1)
LOG	# /50m^2	2.4 (2.5)	2.9 (2.1)	2.2 (1.3)	3.3 (2.6)	**3.1** (2.3)	3.3 (1.8)	**3.5** (2.4)	0.5 (0.9)	**0.3** (0.9)	**1.2** (2.0)
BLDR	# /50m^2	2.2 (1.4)	2.3 (1.2)	2.3 (1.1)	2.6 (1.0)	2.3 (1.2)	2.3 (0.7)	**3.0** (1.1)	2.3 (0.8)	**1.2** (1.3)	**1.6** (1.3)
PAST	count of quadrants	1 (1.4)	0.9 (1.4)	1.5 (1.6)	0.8 (1.0)	1.0 (1.4)	0.8 (1.1)	**0.4** (1.1)	1.5 (1.7)	**2.5** (1.6)	**2.1** (1.6)
HEDGE	m /9 ha	8.8 (27.1)	0 (0)	8.3 (18.6)	3.3 (12.5)	**1.5** (7.9)	0 (0)	**2.2** (13.1)	11.3 (19.5)	**47.1** (53.8)	**10.3** (20.3)
STUMP	# /50m^2	12.7 (11.1)	**6.3** (5.3)	11.3 (6.3)	16.9 (11.2)	13.7 (10.8)	12.3 (6.2)	**8.7** (10.8)	**27.0** (14.5)	11.8 (8.7)	**21.3** (13.2)

APPENDIX 4.3.4 Continued.

Variable[A]	Measurement	All sites	Laughingthrush stri	Minla b-w	Minla c-t	Niltava r-b	Nuthatch w-t	Partridge h	Pheasant N k	Pipit o-b	Robin I b
CUT	# /100 trees	23.7 (22.7)	**10.8** (15.2)	11.1 (15.5)	25.0 (23.4)	18.4 (16.8)	9.7 (9.7)	**9.3** (15.6)	39.6 (30.8)	**46.9** (26.1)	**42.8** (23.0)
PATH	m /9 ha	32.5 (36.4)	19.1 (32.1)	24.8 (36.4)	26.6 (34.5)	**26.2** (36.4)	9.2 (20.5)	**14.3** (22.0)	**52.3** (49.1)	**56.5** (31.5)	**52.5** (38.0)
SP_RICH	# /12 trees	5.7 (1.8)	6.2 (1.9)	5.0 (1.0)	5.3 (1.2)	5.7 (1.4)	5.7 (1.6)	**6.7** (1.7)	**4.0** (1.0)	**4.3** (1.5)	**5.1** (1.4)
FAGACEA	# /100 trees	4.3 (6.6)	3.3 (5.8)	1.4 (3.4)	3.9 (5.3)	3.3 (5.4)	1.4 (3.4)	**8.8** (6.9)	0 (0)	**0** (0)	**1.9** (4.6)
ERICACEA	# /100 trees	8.3 (14.8)	3.3 (5.8)	6.9 (13.4)	5.0 (17.2)	8.3 (20.3)	1.4 (3.4)	**5.1** (12.8)	**27.1** (23.9)	12.3 (21.6)	**12.7** (16.9)
LAURACEA	# /100 trees	9.7 (14.3)	10.0 (13.5)	6.9 (11.1)	7.8 (15.6)	4.4 (7.1)	15.3 (9.7)	**18.1** (17.6)	0 (0)	**0** (0)	**2.7** (6.5)
THEACEA	# /100 trees	32.2 (21.0)	34.2 (25.6)	36.1 (19.5)	**43.9** (19.5)	**42.2** (16.9)	54.2 (18.8)	30.8 (23.0)	41.7 (32.6)	**19.3** (23.1)	**36.4** (19.1)
BA_ACECAM	m^2/ha	4.4 (28.8)	0 (0)	0 (0)	3.6 (7.7)	2.8 (12.1)	5.2 (11.6)	**21.6** (71.4)	0 (0)	0 (0)	**0** (0)
BA_ALACHI	m^2/ha	0.6 (5.4)	0.07 (0.2)	0.07 (0.2)	1.1 (4.1)	1.1 (8.6)	0 (0)	0 (0)	0 (0)	0 (0)	0.2 (1.5)
BA_ALNNEP	m^2/ha	0.7 (4.6)	0 (0)	0 (0)	0 (0)	**0.2** (2.1)	0 (0)	0 (0)	0 (0)	**0.1** (0.3)	0.8 (1.5)
BA_BERARI	m^2/ha	10.4 (31.1)	0.9 (2.8)	0.9 (2.8)	2.6 (6.9)	9.6 (35.2)	2.0 (4.5)	**0.3** (2.0)	**51.2** (36.8)	**29.4** (55.5)	**24.1** (39.6)
BA_CASHYS	m^2/ha	0.2 (2.9)	0 (0)	0 (0)	0 (0)	0.6 (5.1)	0 (0)	0 (0)	0 (0)	0 (0)	0.7 (5.3)

APPENDIX 4.3.4. Continued.

Variable[A]	Measurement	All sites	Laughingthrush stri	Minla b-w	Minla c-t	Niltava r-b	Nuthatch w-t	Partridge h	Pheasant N k	Pipit o-b	Robin I b
BA_DAPBHO	m^2/ha	0.1 (0.6)	0.02 (0.04)	0.02 (0.04)	0.1 (0.3)	0.2 (0.7)	0.2 (0.4)	0.1 (0.2)	0 (0)	0.4 (1.7)	0.2 (0.9)
BA_EURACU	m^2/ha	16.1 (39.6)	3.5 (5.4)	3.5 (5.4)	7.7 (16.4)	23.9 (56.0)	4.6 (9.6)	11.0 (30.4)	1.8 (2.6)	7.9 (17.1)	**30.2** (57.7)
BA_FICNER	m^2/ha	1.7 (6.9)	3.0 (5.0)	3.0 (5.0)	0.7 (2.6)	2.2 (9.2)	0 (0)	2.2 (5.5)	0 (0)	0.7 (2.4)	**0.4** (1.4)
BA_HYDHET	m^2/ha	1.6 (5.4)	0 (0)	0 (0)	**4.5** (8.2)	**2.5** (6.4)	1.2 (2.6)	1.1 (4.0)	0 (0)	0.01 (0.04)	1.8 (5.8)
BA_ILESIK	m^2/ha	3.1 (22.6)	7.2 (15.4)	7.2 (15.4)	24.6 (86.6)	2.0 (8.3)	**67.2** (150.3)	3.0 (11.9)	0 (0)	0 (0)	**0** (0)
BA_LINASS	m^2/ha	1.5 (9.4)	0.6 (1.9)	0.6 (1.9)	0 (0)	1.6 (11.0)	0 (0)	2.6 (15.2)	0 (0)	0 (0)	0.8 (7.1)
BA_LINPUL	m^2/ha	10.0 (83.6)	0 (0)	0 (0)	1.2 (4.7)	17.8 (136.6)	0.5 (1.0)	17.1 (69.8)	0 (0)	0 (0)	**0.9** (7.5)
BA_LITELO	m^2/ha	8.6 (24.5)	24.2 (72.4)	24.2 (72.4)	22.4 (60.4)	7.7 (19.2)	**20.6** (23.7)	10.7 (17.6)	0 (0)	**0** (0)	**7.0** (30.8)
BA_LYOOVA	m^2/ha	27.7 (92.0)	6.7 (13.4)	6.7 (13.4)	11.1 (42.6)	32.2 (117.1)	0 (0)	8.9 (24.9)	141.8 (231.1)	20.1 (59.5)	**48.7** (139.0)
BA_MAGCAM	m^2/ha	2.3 (20.3)	0 (0)	0 (0)	0 (0)	1.7 (8.9)	0 (0)	6.8 (40.5)	0 (0)	0 (0)	1.4 (8.8)
BA_MELPIN	m^2/ha	3.0 (12.7)	6.7 (17.0)	6.7 (17.0)	0.2 (0.6)	2.7 (10.0)	0 (0)	4.9 (15.8)	0 (0)	0.6 (2.4)	**0.8** (3.5)
BA_MICKIS	m^2/ha	3.6 (22.8)	**55.1** (90.9)	55.1 (90.9)	0 (0)	2.6 (16.3)	0 (0)	8.1 (30.9)	0 (0)	0 (0)	0.3 (2.3)

APPENDIX 4.3.4. Continued.

Variable[A]	Measurement	All sites	Laughingthrush stri	Minla b-w	Minla c-t	Niltava r-b	Nuthatch w-t	Partridge h	Pheasant N k	Pipit o-b	Robin I b
BA_MYRSEM	m^2/ha	0.9 (6.3)	1.0 (2.7)	1.0 (2.7)	0 (0)	0.2 (1.2)	0 (0)	**0.7** (2.1)	0 (0)	0 (0)	0.6 (3.4)
BA_PERCLA	m^2/ha	20.4 (45.7)	42.6 (70.3)	42.6 (70.3)	8.3 (16.6)	27.2 (60.2)	14.0 (20.5)	**37.7** (56.5)	0 (0)	**0** (0)	2.6 (12.1)
BA_PERDUT	m^2/ha	3.2 (40.0)	0 (0)	0 (0)	0 (0)	1.1 (10.0)	0 (0)	1.8 (7.8)	0 (0)	0 (0)	9.2 (71.1)
BA_PRUVEN	m^2/ha	2.1 (14.6)	0 (0)	0 (0)	0 (0)	0.6 (4.7)	0 (0)	1.4 (7.1)	0 (0)	0 (0)	0.9 (7.0)
BA_QUELAM	m^2/ha	12.0 (37.7)	13.5 (30.1)	13.5 (30.1)	14.8 (27.1)	16.5 (48.3)	0 (0)	12.9 (35.0)	0 (0)	**0** (0)	7.0 (28.7)
BA_QUEOXY	m^2/ha	11.5 (48.8)	1.7 (5.2)	1.7 (5.2)	12.4 (47.8)	8.3 (31.7)	0 (0)	**40.3** (97.2)	0 (0)	**0** (0)	2.1 (10.9)
BA_RHOARB	m^2/ha	4.6 (18.3)	0 (0)	0 (0)	8.8 (34.2)	4.6 (21.0)	0 (0)	5.0 (20.4)	0 (0)	0.5 (2.3)	3.2 (14.7)
BA_SYMRAM	m^2/ha	0.6 (3.2)	0 (0)	0 (0)	0.2 (0.7)	0 (0)	0 (0)	0.4 (1.9)	3.1 (5.4)	0.8 (2.8)	1.4 (5.3)
BA_SYMTHE	m^2/ha	41.8 (59.9)	15.9 (15.1)	15.9 (15.1)	68.6 (79.7)	**57.3** (70.7)	**143.0** (115.9)	26.0 (36.7)	70.4 (83.3)	**24.3** (52.3)	51.6 (64.7)
BA_TETFRA	m^2/ha	5.3 (21.4)	1.9 (5.3)	1.9 (5.3)	5.7 (22.1)	3.7 (12.1)	0 (0)	3.4 (6.2)	0 (0)	0.2 (0.6)	1.1 (5.3)
BA_VIBERU	m^2/ha	16.1 (26.8)	12.8 (15.1)	12.8 (15.1)	11.3 (19.9)	**18.8** (27.3)	30.9 (57.0)	6.9 (9.0)	5.4 (3.2)	**4.0** (5.3)	19.0 (30.0)

[A] See Appendix 4.1 for descriptions. [B] 36 sample sites in each of seven 9-ha plots.

APPENDIX 4.3.5. Means of habitat variables at sampling sites occupied by white-tailed robin - ashy-throated warbler (standard deviations in parentheses). Bold font indicates occupied sites differ from unoccupied sites at the microhabitat scale; underscore, that species abundance is correlated with a variable at the macrohabitat scale (see Table 4.1 for *P*-values). Plant species detected at <10 sample sites omitted.

Variable[A]	Measurement	All sites	Robin w-t	Shortwing w-b	Sibia r	Sunbird g-t	Tesia, c-h	Tesia g-b	Tit b-t	Tit g-b	Warbler a-t
No. of sites:		252	28	69	32	66	98	27	6	8	35
SLOPE	%	72.8 (29.8)	73.4 (30.5)	**77.5** (28.2)	76.7 (25.4)	71.8 (26.5)	74.4 (27.9)	**87.0** (24.1)	62.8 (27.8)	52.3 (29.7)	**85.3** (20.2)
ASPECT	- -	SW	SW	SW	SW	SW	SW	**NW**	**SE**	**S**	SE
CANCOV	%	77.2 (31.3)	87.3 (14.3)	87.0 (17.5)	84.0 (18.6)	84.6 (21.3)	88.4 (14.5)	**93.3** (13.2)	67.7 (21.4)	**47.8** (32.9)	**92.5** (10.4)
SD_CC	%	13.2 (13.3)	14.5 (13.1)	12.9 (11.1)	15.9 (12.5)	13.7 (12.4)	12.6 (10.7)	8.4 (10.9)	**31.2** (13.9)	**28.4** (11.8)	9.5 (9.8)
T_CV/M	m^3/m^2	7.2 (10.0)	6.6 (4.0)	8.3 (11.9)	7.8 (9.1)	7.9 (8.8)	**8.3** (11.0)	**13.5** (17.6)	8.2 (14.7)	**1.6** (1.3)	**8.6** (6.8)
L_CV/M	m^3/m^2	5.5 (8.5)	**4.9** (3.8)	**6.9** (11.9)	6.8 (9.0)	6.2 (8.7)	**6.7** (10.9)	**8.3** (9.3)	7.1 (14.5)	**0.9** (0.9)	**6.7** (6.7)
M_CV/M	m^3/m^2	1.5 (5.5)	1.3 (1.3)	1.0 (0.8)	0.7 (0.6)	1.3 (1.4)	1.1 (1.0)	**4.6** (16.1)	0.7 (0.7)	0.5 (0.5)	1.1 (1.0)
S_CV/M	m^3/m^2	0.4 (0.9)	0.4 (0.3)	**0.4** (0.4)	0.3 (0.3)	0.5 (1.4)	0.5 (1.2)	**0.6** (0.5)	0.3 (0.2)	0.1 (0.2)	0.8 (2.0)
L_LCAN	m	4.4 (2.8)	4.6 (2.9)	**5.0** (2.8)	4.9 (2.7)	4.7 (2.8)	4.8 (2.7)	**7.0** (2.7)	2.2 (0.7)	**1.9** (1.2)	**5.5** (2.9)
M_LCAN	m	3.0 (1.7)	3.2 (1.9)	**3.3** (1.5)	2.8 (1.6)	3.0 (1.6)	**3.2** (1.6)	**4.5** (1.6)	**1.6** (0.9)	**1.6** (1.2)	**3.5** (1.5)
S_LCAN	m	1.8 (0.6)	2.0 (0.6)	**1.9** (0.6)	1.6 (0.5)	1.9 (0.7)	1.8 (0.6)	1.9 (0.5)	1.8 (0.4)	1.7 (0.4)	1.9 (0.7)

APPENDIX 4.3.5 Continued.

Variable[A]	Measurement	All sites	Robin w-t	Shortwing w-b	Sibia r	Sunbird g-t	Tesia, c-h	Tesia g-b	Tit b-t	Tit g-b	Warbler a-t
TBA/H	m^2/ha	48.3 (39.4)	57.5 (36.9)	**57.0** (36.2)	47.3 (26.6)	50.1 (34.7)	**52.8** (28.9)	57.3 (39.7)	88.8 (98.8)	**23.0** (16.3)	54.4 (34.5)
VL_DENS	trees/ha	22.2 (44.3)	18.6 (31.4)	29.0 (55.8)	31.7 (48.4)	**31.2** (52.9)	27.1 (49.4)	**41.2** (41.8)	49.5 (110.8)	0 (0)	30.4 (44.5)
L_DENS	trees/ha	241.6 (216.6)	321.8 (289.4)	**316.6** (229.4)	216.6 (131.6)	244.1 (206.4)	**291.6** (193.9)	217.1 (178.6)	447.9 (464.6)	145.7 (122.5)	275.5 (225.2)
M_DENS	trees/ha	439.8 (492.6)	588.5 (517.1)	**467.6** (349.9)	339.4 (197.5)	474.9 (391.7)	**458.1** (376.5)	535.3 (611.0)	491.9 (322.6)	322.2 (274.1)	392.5 (276.2)
S_DENS	trees/ha	1565.6 (1681.4)	1572.8 (1144.2)	1494.9 (1201.6)	1415.8 (1039.5)	1478.5 (1631.0)	1539.3 (1427.9)	1777.2 (1408.9)	1358.4 (620.6)	**687.0** (540.4)	1739.8 (2240.9)
VL_HT	m	19.1 (6.0)	21.1 (7.1)	19.8 (6.0)	20.8 (5.6)	19.1 (5.5)	20.4 (6.0)	19.8 (5.3)	19.1 (0)	- -	20.2 (5.3)
LG_HT	m	10.6 (4.9)	11.4 (4.8)	**11.5** (4.3)	12.3 (5.5)	11.6 (4.7)	**11.6** (4.1)	**14.7** (4.8)	7.0 (1.8)	**5.1** (2.7)	**13.1** (4.9)
MD_HT	m	6.8 (2.5)	7.1 (2.4)	7.2 (2.0)	6.3 (2.1)	7.1 (2.3)	**7.2** (2.0)	**9.0** (2.5)	**4.8** (1.5)	4.8 (1.8)	**7.6** (2.0)
SM_HT	m	3.0 (0.8)	3.2 (0.8)	3.2 (0.9)	**2.7** (0.7)	3.0 (0.8)	3.0 (0.9)	**3.3** (0.7)	2.7 (0.5)	2.3 (0.4)	**3.3** (1.0)
VL_DBH	cm	79.6 (15.0)	79.0 (16.8)	43.1 (10.6)	83.2 (12.6)	78.3 (13.6)	79.5 (14.3)	**85.2** (13.3)	71.0 (0.0)	- -	83.5 (17.8)
LG_DBH	cm	42.8 (12.0)	43.9 (10.5)	43.1 (10.6)	47.6 (13.4)	44.4 (10.3)	43.0 (9.8)	**50.9** (13.0)	39.6 (9.5)	33.4 (13.8)	45.9 (10.7)
MD_DBH	cm	15.7 (2.6)	15.6 (2.2)	15.7 (2.0)	**15.1** (1.7)	15.5 (2.1)	15.6 (2.0)	16.1 (2.5)	14.2 (1.4)	15.6 (2.4)	15.5 (2.1)

APPENDIX 4.3.5 Continued.

Variable[A]	Measurement	All sites	Robin w-t	Shortwing w-b	Sibia r	Sunbird g-t	Tesia, c-h	Tesia g-b	Tit b-t	Tit g-b	Warbler a-t
SM_DBH	cm	4.5 (1.1)	4.7 (1.1)	4.5 (1.1)	**4.1** (0.9)	4.5 (1.0)	**4.3** (1.1)	4.5 (0.9)	4.3 (0.9)	4.5 (0.8)	4.6 (1.2)
HT:DBH	m/cm	0.46 (0.12)	0.47 (0.11)	**0.48** (0.10)	0.45 (0.10)	0.47 (0.11)	**0.48** (0.09)	**0.53** (0.09)	0.39 (0.06)	**0.34** (0.07)	**0.50** (0.09)
SRB_COV	cm	165.9 (172.3)	193.1 (140.1)	157.4 (152.2)	198.3 (189.5)	136.7 (119.7)	**179.1** (145.4)	**98.3** (101.8)	118.2 (89.3)	156.4 (115.7)	**144.6** (126.6)
SRB_EDG	line intercept	4.3 (4.0)	**6.6** (5.8)	3.9 (3.1)	4.7 (4.0)	4.5 (3.8)	4.4 (3.4)	**1.8** (2.0)	4.3 (3.3)	**9.4** (4.5)	**4.0** (3.1)
BAM_COV	cm	348.5 (639.5)	421.6 (665.9)	350.4 (524.6)	258.6 (497.8)	392.5 (771.7)	265.2 (492.7)	415.7 (708.1)	120.0 (268.3)	**0** (0)	402.9 (593.5)
FRN_COV	cm	774.0 (6912.4)	793.2 (794.3)	**882.4** (678.0)	952.9 (809.0)	**977.4** (807.0)	**851.6** (657.6)	**1457.5** (713.9)	517.0 (637.2)	**306.9** (241.6)	860.5 (626.0)
LOG	# /50m^2	2.4 (2.5)	2.0 (2.2)	**2.9** (2.7)	3.0 (2.7)	**3.1** (2.5)	**2.9** (2.6)	**3.7** (2.1)	**0.5** (1.1)	**0.3** (0.4)	2.7 (1.9)
BLDR	# /50m^2	2.2 (1.4)	2.1 (1.3)	**2.7** (1.2)	**2.2** (1.2)	2.1 (1.2)	**2.4** (1.3)	2.4 (1.2)	**1.0** (1.0)	1.8 (0.4)	2.3 (1.1)
PAST	count of quadrants	1 (1.4)	1.3 (1.5)	0.7 (1.2)	1.0 (1.4)	1.0 (1.4)	0.8 (1.3)	**0.07** (0.4)	1.8 (1.3)	2.4 (1.7)	**0.4** (0.9)
HEDGE	m /9 ha	8.8 (27.1)	1.3 (6.5)	**0.1** (1.2)	3.8 (11.9)	**0.8** (6.1)	**1.4** (7.3)	0 (0)	12.5 (19.1)	**31.3** (51.9)	**0** (0)
STUMP	# /50m^2	12.7 (11.1)	17.9 (15.7)	13.0 (11.1)	14.1 (10.5)	14.0 (11.6)	**14.4** (10.7)	**7.3** (8.5)	18.5 (12.8)	14.4 (11.1)	**8.9** (9.5)
CUT	# /100 trees	23.7 (22.7)	25.9 (22.1)	**17.8** (17.6)	22.9 (21.2)	22.2 (18.6)	**17.9** (16.4)	**13.0** (15.6)	**43.1** (13.1)	**42.7** (21.8)	**13.6** (14.1)
PATH	m /9 ha	32.5 (36.4)	37.9 (39.9)	26.4 (33.6)	30.6 (36.7)	28.4 (37.0)	33.3 (38.2)	**8.4** (18.9)	49.5 (27.2)	**68.1** (27.8)	26.3 (36.1)

APPENDIX 4.3.5. Continued.

Variable[A]	Measurement	All sites	Robin w-t	Shortwing w-b	Sibia r	Sunbird g-t	Tesia, c-h	Tesia g-b	Tit b-t	Tit g-b	Warbler a-t
SP_RICH	# /12 trees	5.7 (1.8)	6.3 (1.6)	6.0 (1.6)	5.4 (1.8)	5.8 (1.7)	5.8 (1.6)	**6.7** (1.6)	5.5 (1.3)	5.1 (1.5)	6.1 (1.8)
FAGACEA	# /100 trees	4.3 (6.6)	5.1 (6.9)	4.2 (6.0)	4.2 (6.4)	5.7 (7.6)	3.9 (5.2)	**8.6** (7.1)	0 (0)	1.0 (3.0)	5.5 (7.8)
ERICACEA	# /100 trees	8.3 (14.8)	10.4 (16.6)	7.7 (15.5)	6.3 (16.8)	**6.1** (14.1)	7.6 (14.3)	**0.9** (4.8)	19.4 (28.2)	10.4 (11.6)	5.0 (10.3)
LAURACEA	# /100 trees	9.7 (14.3)	8.3 (15.9)	**14.9** (17.4)	9.9 (11.7)	9.7 (13.5)	**11.8** (15.9)	**17.3** (15.8)	0 (0)	0 (0)	12.4 (16.7)
THEACEA	# /100 trees	32.2 (21.0)	37.2 (19.3)	33.6 (19.2)	**38.8** (18.3)	35.2 (20.30	**38.9** (20.3)	35.2 (18.4)	30.6 (12.5)	28.1 (26.3)	34.3 (21.3)
BA_ACECAM	m^2/ha	4.4 (28.8)	1.8 (9.6)	3.2 (10.6)	2.7 (9.4)	8.5 (52.9)	3.7 (12.0)	2.3 (9.9)	0 (0)	2.5 (6.5)	14.2 (71.7)
BA_ALACHI	m^2/ha	0.6 (5.4)	0.4 (2.2)	1.5 (9.7)	0.5 (2.8)	0.01 (0.09)	0.3 (2.7)	0.6 (3.0)	2.2 (5.0)	0 (0)	2.2 (12.8)
BA_ALNNEP	m^2/ha	0.7 (4.6)	1.1 (6.1)	0.9 (5.5)	0.2 (0.9)	**0.3** (2.3)	0.7 (5.2)	0.08 (0.5)	2.3 (5.3)	0.05 (0.1)	0.06 (0.3)
BA_BERARI	m^2/ha	10.4 (31.1)	20.3 (39.7)	9.8 (28.6)	13.3 (32.6)	12.1 (35.8)	10.3 (32.4)	**0** (0)	24.0 (48.7)	23.0 (26.7)	4.5 (17.2)
BA_CASHYS	m^2/ha	0.2 (2.9)	0.6 (5.3)	0.03 (0.3)	0 (0)	0.7 (5.7)	0.5 (4.7)	**0.1** (0.5)	0 (0)	0 (0)	0 (0)
BA_DAPBHO	m^2/ha	0.1 (0.6)	0.2 (0.9)	0.07 (0.2)	0.09 (0.3)	0.2 (0.6)	0.2 (0.6)	(0.06 (0.2)	0.2 (0.3)	0.9 (2.4)	0.06 (0.2)
BA_EURACU	m^2/ha	16.1 (39.6)	**29.3** (57.8)	11.1 (23.6)	25.6 (58.7)	21.8 (52.0)	20.8 (51.3)	5.4 (10.5)	23.0 (28.8)	17.1 (24.0)	9.0 (18.1)
BA_FICNER	m^2/ha	1.7 (6.9)	0.6 (1.9)	**0.8** (3.4)	0.9 (2.3)	1.2 (5.2)	**0.6** (3.3)	**3.0** (7.9)	0.7 (1.6)	0.04 (0.1)	3.7 (9.2)

APPENDIX 4.3.5. Continued.

Variable[A]	Measurement	All sites	Robin w-t	Shortwing w-b	Sibia r	Sunbird g-t	Tesia, c-h	Tesia g-b	Tit b-t	Tit g-b	Warbler a-t
BA_HYDHET	m^2/ha	1.6 (5.4)	2.3 (6.7)	3.0 (7.0)	2.3 (5.9)	1.9 (5.0)	**2.7** (6.2)	2.8 (8.7)	0.1 (0.3)	0 (0)	2.2 (5.6)
BA_ILESIK	m^2/ha	3.1 (22.6)	1.3 (6.7)	2.4 (10.6)	0 (0)	1.6 (6.4)	2.6 (10.6)	3.5 (10.3)	0 (0)	0 (0)	14.6 (56.9)
BA_LINASS	m^2/ha	1.5 (9.4)	1.0 (7.3)	2.6 (12.5)	1.2 (6.8)	0.7 (4.8)	2.4 (13.0)	2.3 (11.9)	0 (0)	0 (0)	6.3 (21.1)
BA_LINPUL	m^2/ha	10.0 (83.6)	0.9 (7.5)	5.9 (19.2)	2.3 (11.6)	8.4 (51.9)	4.3 (16.3)	6.0 (21.9)	0 (0)	0 (0)	12.0 (69.7)
BA_LITELO	m^2/ha	8.6 (24.5)	9.1 (32.8)	**17.3** (37.3)	11.8 (41.0)	10.6 (34.6)	**13.1** (31.5)	**14.6** (31.7)	0 (0)	0 (0)	4.5 (10.2)
BA_LYOOVA	m^2/ha	27.7 (92.0)	43.9 (132.5)	20.6 (50.2)	13.8 (48.9)	15.0 (42.9)	19.2 (47.2)	**1.8** (9.0)	190.7 (356.6)	9.8 (14.5)	20.4 (54.8)
BA_MAGCAM	m^2/ha	2.3 (20.3)	1.6 (9.0)	6.6 (37.2)	0 (0)	0 (0)	5.4 (32.0)	0 (0)	0 (0)	0 (0)	0 (0)
BA_MELPIN	m^2/ha	3.0 (12.7)	0.5 (2.8)	5.0 (19.2)	0.8 (3.4)	3.0 (9.3)	**1.8** (8.8)	4.3 (12.8)	0 (0)	0 (0)	1.3 (4.5)
BA_MICKIS	m^2/ha	3.6 (22.8)	3.5 (24.8)	4.3 (27.4)	5.2 (23.7)	1.4 (8.0)	**0.04** (0.4)	**19.1** (52.4)	3.7 (7.5)	0 (0)	10.9 (42.1)
BA_MYRSEM	m^2/ha	0.9 (6.3)	0.7 (3.5)	0.1 (1.0)	0.01 (0.07)	0.4 (2.5)	0.8 (5.0)	0.4 (1.6)	0 (0)	0 (0)	0.8 (3.5)
BA_PERCLA	m^2/ha	20.4 (45.7)	8.1 (21.5)	22.5 (38.2)	33.6 (53.0)	24.3 (46.8)	21.5 (40.3)	**43.6** (54.2)	0 (0)	**0** (0)	**37.9** (48.2)
BA_PERDUT	m^2/ha	3.2 (40.0)	9.3 (71.6)	10.5 (75.6)	2.9 (15.9)	2.4 (12.5)	0.9 (9.2)	23.2 (118.4)	0 (0)	0 (0)	1.2 (7.3)
BA_PRUVEN	m^2/ha	2.1 (14.6)	2.0 (11.9)	**5.8** (26.2)	0 (0)	0.07 (0.6)	2.6 (12.2)	0 (0)	0 (0)	0 (0)	1.1 (6.5)

APPENDIX 4.3.5. Continued.

Variable[A]	Measurement	All sites	Robin w-t	Shortwing w-b	Sibia r	Sunbird g-t	Tesia, c-h	Tesia g-b	Tit b-t	Tit g-b	Warbler a-t
BA_QUELAM	m^2/ha	12.0 (37.7)	7.5 (27.2)	13.8 (37.9)	17.8 (46.0)	15.7 (42.8)	14.2 (38.7)	**23.7** (42.8)	0 (0)	1.0 (2.6)	12.6 (38.4)
BA_QUEOXY	m^2/ha	11.5 (48.8)	4.1 (14.7)	15.2 (68.0)	12.0 (43.3)	17.1 (52.1)	16.2 (64.6)	**26.6** (68.0)	0 (0)	0 (0)	14.2 (51.0)
BA_RHOARB	m^2/ha	4.6 (18.3)	3.3 (15.5)	5.6 (20.4)	1.2 (5.7)	3.1 (16.8)	6.0 (22.1)	0.2 (1.0)	24.8 (48.4)	0 (0)	3.2 (13.9)
BA_SYMRAM	m^2/ha	0.6 (3.2)	1.0 (4.9)	0 (0)	0.5 (2.7)	0.8 (3.2)	0.5 (3.3)	0.7 (2.4)	0 (0)	**3.5** (6.1)	0.2 (0.8)
BA_SYMTHE	m^2/ha	41.8 (59.9)	**50.7** (64.3)	48.7 (61.5)	40.8 (51.6)	**45.8** (57.0)	**52.2** (59.4)	52.9 (70.7)	38.3 (57.9)	35.0 (42.2)	37.6 (59.6)
BA_TETFRA	m^2/ha	5.3 (21.4)	1.4 (5.9)	6.6 (17.7)	4.5 (16.2)	1.7 (5.9)	7.4 (30.0)	**7.0** (21.9)	0 (0)	1.1 (2.8)	7.6 (19.4)
BA_VIBERU	m^2/ha	16.1 (26.8)	17.3 (24.5)	18.9 (27.6)	15.7 (18.9)	**20.6** (30.0)	17.6 (26.3)	11.7 (17.1)	26.8 (42.3)	3.1 (3.3)	20.1 (26.2)

[A] See Appendix 4.1 for descriptions.

APPENDIX 4.3.6. Means of habitat variables at sampling sites occupied by brownish-flanked bush warbler - whiskered yuhina (standard deviations in parentheses). Bold font indicates occupied sites differ from unoccupied sites at the microhabitat scale; underscore, that species abundance is correlated with a variable at the macrohabitat scale (see Table 4.1 for *P*-values). Plant species detected at <10 sample sites omitted.

Variable^A	Measurement	All sites	Warbler b-f b	Warbler g-s	Warbler g-h	Yuhina s-t	Yuhina w
No. of sites:		252	7	61	19	6	53
SLOPE	%	72.8 (29.8)	75.0 (8.0)	**80.7** (26.2)	68.3 (31.6)	70.7 (25.6)	74.0 (25.8)
ASPECT	- -	SW	**E**	SW	SW	SW	SW
CANCOV	%	77.2 (31.3)	**51.4** (28.3)	86.8 (20.3)	77.2 (30.9)	69.7 (36.1)	84.2 (21.7)
SD_CC	%	13.2 (13.3)	**29.8** (11.3)	11.9 (11.0)	13.6 (12.4)	13.1 (11.7)	13.0 (12.0)
T_CV/M	m^3/m^2	7.2 (10.0)	**1.1** (1.0)	7.5 (12.6)	9.4 (19.4)	8.3 (9.6)	9.4 (13.9)
L_CV/M	m^3/m^2	5.5 (8.5)	**0.1** (0.1)	4.9 (7.0)	3.6 (4.3)	7.2 (8.8)	6.3 (8.5)
M_CV/M	m^3/m^2	1.5 (5.5)	**0.4** (0.5)	2.3 (10.8)	5.6 (19.2)	0.9 (1.3)	2.6 (11.5)
S_CV/M	m^3/m^2	0.4 (0.9)	0.6 (0.8)	0.3 (0.3)	3.3 (0.3)	0.1 (0.1)	0.5 (1.6)
L_LCAN	m	4.4 (2.8)	**2.2** (1.1)	4.4 (2.4)	4.2 (3.1)	4.2 (2.1)	4.7 (2.8)
M_LCAN	m	3.0 (1.7)	1.6 (0.4)	2.9 (1.5)	2.7 (1.6)	2.5 (0.9)	3.2 (1.6)
S_LCAN	m	1.8 (0.6)	1.7 (0.2)	1.8 (0.6)	1.8 (0.4)	1.8 (0.2)	1.8 (0.6)

APPENDIX 4.3.6. Continued.

Variable[A]	Measurement	All sites	Warbler b-f b	Warbler g-s	Warbler g-h	Yuhina s-t	Yuhina w
TBA/H	m^2/ha	48.3 (39.4)	**19.1** (21.0)	49.8 (32.3)	56.4 (51.5)	43.3 (28.9)	52.0 (37.2)
VL_DENS	trees/ha	22.2 (44.3)	19.1 (27.8)	25.2 (56.9)	14.2 (30.2)	39.8 (59.0)	31.0 (55.4)
L_DENS	trees/ha	241.6 (216.6)	**71.9** (141.1)	275.2 (245.4)	251.6 (282.2)	260.0 (203.0)	245.1 (189.8)
M_DENS	trees/ha	439.8 (492.6)	358.6 (525.7)	484.1 (428.2)	491.8 (593.0)	252.8 (141.9)	463.1 (423.5)
S_DENS	trees/ha	1565.6 (1681.4)	3135.0 (3595.7)	1399.5 (943.0)	1298.1 (969.0)	820.0 (626.7)	1763.0 (1920.9)
VL_HT	m	19.1 (6.0)	- -	18.0 (5.8)	18.2 (4.9)	16.0 (7.5)	**21.5** (5.8)
LG_HT	m	10.6 (4.9)	**6.5** (3.0)	11.0 (4.1)	9.8 (5.3)	11.7 (4.7)	11.8 (4.9)
MD_HT	m	6.8 (2.5)	**4.8** (1.8)	6.9 (2.1)	6.5 (2.5)	6.1 (1.2)	7.2 (2.3)
SM_HT	m	3.0 (0.8)	2.8 (0.3)	2.9 (0.8)	2.8 (0.7)	3.2 (0.5)	2.9 (0.8)
VL_DBH	cm	79.6 (15.0)	- -	77.8 (12.1)	89.1 (19.7)	71.3 (6.3)	78.4 (13.3)
LG_DBH	cm	42.8 (12.0)	**35.6** (4.9)	43.6 (10.2)	42.7 (15.6)	43.7 (6.4)	45.1 (10.6)
MD_DBH	cm	**15.7** (2.6)	14.1 (2.4)	15.6 (2.1)	16.2 (2.1)	17.2 (1.8)	15.6 (2.0)
SM_DBH	cm	4.5 (1.1)	4.4 (0.9)	4.4 (1.2)	4.7 (0.9)	5.1 (0.5)	4.3 (1.1)

APPENDIX 4.3.6. Continued.

Variable[A]	Measurement	All sites	Warbler b-f b	Warbler g-s	Warbler g-h	Yuhina s-t	Yuhina w
HT:DBH	m/cm	0.46 (0.12)	0.39 (0.06)	0.47 (0.10)	0.42 (0.12)	0.42 (0.11)	0.47 (0.10)
SRB_COV	cm	165.9 (172.3)	**344.6** (188.9)	145.5 (127.6)	191.7 (157.4)	102.8 (94.4)	**197.0** (140.9)
SRB_EDG	line intercept	4.3 (4.0)	3.3 (5.2)	4.7 (3.6)	6.2 (5.2)	4.7 (2.8)	4.6 (3.6)
BAM_COV	cm	348.5 (639.5)	**0** (0)	340.3 (573.8)	396.8 (882.4)	264.7 (566.0)	284.8 (569.9)
FRN_COV	cm	774.0 (6912.4)	708.3 (370.7)	789.3 (701.6)	512.2 (429.7)	424.7 (220.7)	868.5 (801.4)
LOG	# /50m^2	2.4 (2.5)	**0** (0)	**2.8** (2.0)	1.6 (2.0)	2.7 (1.2)	**2.9** (2.5)
BLDR	# /50m^2	2.2 (1.4)	**1.1** (0.6)	2.2 (1.2)	2.2 (1.1)	2.8 (0.7)	2.3 (1.2)
PAST	count of quadrants	1 (1.4)	0.3 (0.7)	1.2 (1.5)	1.1 (1.4)	1.7 (1.5)	1.0 (1.3)
HEDGE	m /9 ha	8.8 (27.1)	0 (0)	**1.4** (7.8)	18.7 (52.8)	0 (0)	**1.8** (8.3)
STUMP	# /50m^2	12.7 (11.1)	7.0 (6.6)	14.7 (11.3)	**21.2** (16.2)	18.2 (7.9)	**14.1** (8.2)
CUT	# /100 trees	23.7 (22.7)	28.6 (20.3)	18.9 (18.5)	**38.2** (25.7)	11.1 (7.9)	22.8 (20.7)
PATH	m /9 ha	32.5 (36.4)	46.9 (21.0)	32.0 (36.1)	38.8 (37.5)	28.5 (35.7)	28.2 (36.8)
SP_RICH	# /12 trees	5.7 (1.8)	4.9 (0.6)	5.8 (1.6)	5.5 (1.8)	4.8 (1.3)	5.4 (1.6)

APPENDIX 4.3.6. Continued.

Variable[A]	Measurement	All sites	Warbler b-f b	Warbler g-s	Warbler g-h	Yuhina s-t	Yuhina w
FAGACEA	# /100 trees	4.3 (6.6)	1.2 (3.2)	3.8 (5.8)	2.6 (4.9)	4.2 (10.2)	4.6 (6.9)
ERICACEA	# /100 trees	8.3 (14.8)	1.2 (3.2)	**5.2** (11.7)	8.8 (15.8)	8.3 (12.9)	6.5 (16.5)
LAURACEA	# /100 trees	9.7 (14.3)	**0** (0)	10.5 (14.8)	4.8 (9.3)	1.4 (3.4)	9.0 (11.2)
THEACEA	# /100 trees	32.2 (21.0)	23.8 (20.1)	**37.0** (20.9)	34.6 (21.6)	41.7 (13.9)	**42.1** (22.5)
BA_ACECAM	m^2/ha	4.4 (28.8)	0 (0)	2.5 (10.3)	0.1 (0.6)	0 (0)	0.7 (3.9)
BA_ALACHI	m^2/ha	0.6 (5.4)	0 (0)	0.7 (3.9)	0 (0)	0 (0)	0.02 (0.1)
BA_ALNNEP	m^2/ha	0.7 (4.6)	**2.5** (4.9)	0.7 (5.3)	0 (0.02)	0 (0)	**0** (0)
BA_BERARI	m^2/ha	10.4 (31.1)	4.4 (5.8)	15.1 (45.4)	9.4 (23.2)	0 (0)	8.7 (25.6)
BA_CASHYS	m^2/ha	0.2 (2.9)	0.2 (0.6)	0 (0)	2.4 (10.4)	0 (0)	0.04 (0.3)
BA_DAPBHO	m^2/ha	0.1 (0.6)	0 (0)	0.2 (0.8)	0.2 (0.4)	0.02 (0.04)	0.1 (0.4)
BA_EURACU	m^2/ha	16.1 (39.6)	30.6 (50.1)	18.6 (40.3)	36.3 (80.0)	6.4 (3.6)	19.6 (44.1)
BA_FICNER	m^2/ha	1.7 (6.9)	0.04 (0.1)	0.9 (2.5)	0.6 (1.3)	0 (0)	1.0 (3.5)
BA_HYDHET	m^2/ha	1.6 (5.4)	0 (0)	**2.4** (5.5)	2.2 (5.2)	2.5 (5.6)	1.8 (6.1)

APPENDIX 4.3.6. Continued.

Variable[A]	Measurement	All sites	Warbler b-f b	Warbler g-s	Warbler g-h	Yuhina s-t	Yuhina w
BA_ILESIK	m^2/ha	3.1 (22.6)	0 (0)	7.6 (43.3)	0 (0)	0 (0)	1.9 (6.9)
BA_LINASS	m^2/ha	1.5 (9.4)	0 (0)	3.1 (15.7)	0 (0)	0 (0)	0.8 (5.3)
BA_LINPUL	m^2/ha	10.0 (83.6)	0 (0)	0.8 (4.6)	1.9 (8.0)	0 (0)	2.1 (10.3)
BA_LITELO	m^2/ha	8.6 (24.5)	0.7 (1.6)	12.4 (33.7)	4.2 (17.4)	0.7 (1.5)	11.6 (35.7)
BA_LYOOVA	m^2/ha	27.7 (92.0)	0.2 (0.4)	9.5 (28.8)	45.9 (127.1)	13.8 (23.3)	13.5 (44.2)
BA_MAGCAM	m^2/ha	2.3 (20.3)	0.7 (1.7)	0 (0)	13.0 (55.1)	0 (0)	0 (0)
BA_MELPIN	m^2/ha	3.0 (12.7)	3.7 (7.5)	3.0 (11.8)	2.5 (7.3)	0 (0)	1.3 (5.6)
BA_MICKIS	m^2/ha	3.6 (22.8)	0 (0)	3.3 (25.2)	10.2 (32.3)	0 (0)	2.1 (11.4)
BA_MYRSEM	m^2/ha	0.9 (6.3)	0 (0)	0.3 (1.0)	0.7 (2.1)	0.6 (1.4)	0.2 (1.0)
BA_PERCLA	m^2/ha	20.4 (45.7)	0 (0)	26.1 (48.1)	13.0 (27.0)	0 (0)	19.9 (39.7)
BA_PERDUT	m^2/ha	3.2 (40.0)	(0)	0.3 (2.5)	0 (0)	0 (0)	13.6 (86.0)
BA_PRUVEN	m^2/ha	2.1 (14.6)	0 (0)	0.08 (0.6)	0 (0)	0 (0)	0.09 (0.7)
BA_QUELAM	m^2/ha	12.0 (37.7)	0 (0)	12.3 (32.7)	11.4 (29.6)	40.3 (90.2)	22.4 (53.8)

APPENDIX 4.3.6. Continued.

Variable[A]	Measurement	All sites	Warbler b-f b	Warbler g-s	Warbler g-h	Yuhina s-t	Yuhina w
BA_QUEOXY	m^2/ha	11.5 (48.8)	0 (0)	6.4 (31.7)	1.0 (4.4)	0 (0)	13.0 (50.2)
BA_RHOARB	m^2/ha	4.6 (18.3)	0 (0)	5.4 (22.3)	6.4 (25.4)	19.0 (42.5)	5.3 (23.6)
BA_SYMRAM	m^2/ha	0.6 (3.2)	0 (0)	0.3 (2.4)	0 (0)	0 (0)	0.05 (0.4)
BA_SYMTHE	m^2/ha	41.8 (59.9)	**10.8** (22.0)	**52.6** (67.8)	66.2 (75.1)	90.6 (103.3)	**61.0** (69.8)
BA_TETFRA	m^2/ha	5.3 (21.4)	0 (0)	4.3 (15.3)	3.0 (5.6)	**4.6** (5.9)	1.8 (6.2)
BA_VIBERU	m^2/ha	16.1 (26.8)	20.7 (31.0)	**19.6** (23.0)	16.2 (17.2)	13.9 (6.3)	18.5 (26.4)

[A] See Appendix 4.1 for descriptions.

[B] 36 sample sites in each of seven 9-ha plots.

APPENDIX 4.4. Means of habitat variables at sampling sites occupied by small mammal species (standard deviations in parentheses). Bold font indicates occupied sites differ from unoccupied sites at the microhabitat scale; underscore, that species abundance is correlated with a variable at the macrohabitat scale (see Table 4.2 for *P*-values). Plant species detected at <10 sample sites omitted.

Variable[A]	Measurement	All sites[B]	Mouse, h	Rat, b	Rat, c	Rat s-b	Shrew, b-t	Shrew, l-c	Shrew, l-t	Shrew, p
No. of sites:	- -	252	9	25	53	40	41	38	6	25
SLOPE	%	72.8 (29.8)	**46.0** (28.7)	61.4 (26.0)	69.6 (32.8)	77.5 (26.3)	**85.0** (29.4)	69.9 (26.8)	72.0 (17.4)	63.8 (30.1)
ASPECT	- -	SW	SW	**SE**	SW	SW	**NW**	SW	SW	**SE**
CANCOV	%	77.2 (31.3)	**47.1** (41.0)	73.6 (30.7)	78.4 (31.0)	**89.1** (18.1)	**92.9** (15.2)	76.6 (28.8)	90.4 (6.7)	**60.0** (38.5)
SD_CC	%	13.2 (13.3)	17.6 (15.1)	16.5 (13.5)	11.9 (10.9)	9.4 (9.5)	**6.9** (8.2)	16.4 (13.8)	12.3 (8.2)	16.2 (16.2)
T_CV/M	m^3/m^2	7.2 (10.0)	**2.0** (3.0)	6.3 (5.8)	5.3 (0.4)	**11.2** (14.7)	**9.5** (9.3)	5.9 (6.2)	6.4 (4.1)	**2.7** (3.0)
L_CV/M	m^3/m^2	5.5 (8.5)	1.9 (2.2)	3.7 (4.8)	3.7 (4.6)	**9.7** (14.8)	**8.0** (9.4)	4.3 (5.9)	4.8 (4.1)	**1.8** (2.6)
M_CV/M	m^3/m^2	1.5 (5.5)	0.5 (0.6)	1.9 (2.5)	1.2 (1.3)	1.2 (1.4)	1.1 (0.9)	1.3 (2.0)	1.2 (1.1)	0.7 (0.8)
S_CV/M	m^3/m^2	0.4 (0.9)	0.3 (0.6)	0.7 (2.3)	0.3 (0.4)	0.3 (0.3)	0.4 (0.5)	0.3 (0.3)	0.4 (0.3)	0.2 (0.3)
L_LCAN	m	4.4 (2.8)	**2.4** (1.6)	3.7 (2.1)	4.4 (2.8)	**5.3** (2.4)	**5.8** (2.4)	3.6 (2.4)	6.1 (1.4)	**3.1** (1.9)
M_LCAN	m	3.0 (1.7)	**1.9** (1.4)	2.5 (1.3)	2.9 (1.7)	**3.7** (1.7)	**4.0** (1.4)	2.7 (1.6)	4.0 (1.1)	**2.3** (1.3)
S_LCAN	m	1.8 (0.6)	1.8 (0.4)	1.7 (0.6)	**1.6** (0.5)	1.7 (0.5)	1.9 (0.6)	1.6 (0.4)	1.7 (0.3)	1.6 (0.4)

APPENDIX 4.4. Continued.

Variable[A]	Measurement	All sites	Mouse, h	Rat, b	Rat, c	Rat s-b	Shrew, b-t	Shrew, 1-c	Shrew, 1-t	Shrew, p
TBA/H	m^2/ha	48.3 (39.4)	55.1 (82.3)	52.7 (55.2)	53.2 (47.7)	**58.0** (34.0)	**59.3** (39.4)	49.7 (35.0)	40.2 (19.6)	**28.4** (27.8)
VL_DENS	trees/ha	22.2 (44.3)	**0** (0)	15.0 (35.3)	21.4 (42.5)	28.6 (55.0)	20.1 (37.9)	25.0 (51.2)	12.4 (18.7)	16.6 (33.5)
L_DENS	trees/ha	241.6 (216.6)	255.0 (299.5)	274.1 (277.5)	252.6 (242.1)	**351.3** (262.1)	**322.7** (226.4)	237.5 (149.8)	269.8 (181.0)	**125.5** (137.3)
M_DENS	trees/ha	439.8 (492.6)	302.7 (282.4)	583.5 (963.7)	469.5 (433.2)	426.7 (318.1)	**405.1** (295.1)	469.7 (450.7)	306.5 (237.0)	**378.5** (507.0)
S_DENS	trees/ha	1565.6 (1681.4)	1258.0 (1541.0)	1787.5 (2614.7)	1500.1 (1507.0)	1524.5 (1600.8)	1456.3 (1705.0)	1674.7 (1544.0)	1741.2 (680.0)	**1387.5** (1240.5)
VL_HT	m	19.1 (6.0)	- -	- -	- -	**23.3** (7.6)	**23.6** (5.8)	17.2 (4.5)	15.5 (0.8)	16.1 (4.1)
LG_HT	m	10.6 (4.9)	**6.2** (3.2)	9.0 (4.3)	10.9 (4.5)	**12.5** (4.1)	**13.1** (3.3)	9.7 (4.5)	13.4 (2.9)	**7.8** (4.9)
MD_HT	m	6.8 (2.5)	**5.2** (2.9)	6.3 (2.1)	6.6 (2.6)	**7.7** (2.3)	**8.2** (2.0)	6.4 (2.3)	8.4 (1.7)	**5.5** (2.3)
SM_HT	m	3.0 (0.8)	2.8 (1.0)	2.7 (0.8)	**2.7** (0.8)	3.0 (0.8)	**3.3** (0.8)	2.8 (0.6)	3.4 (0.8)	2.7 (0.6)
VL_DBH	cm	79.6 (15.0)	- -	- -	- -	83.2 (15.6)	82.6 (16.4)	82.1 (18.5)	96.0 (12.0)	70.0 (2.0)
LG_DBH	cm	42.8 (12.0)	38.4 (15.6)	**37.6** (11.0)	44.3 (10.0)	42.4 (9.4)	43.4 (10.8)	43.8 (11.9)	40.3 (6.8)	40.4 (16.5)
MD_DBH	cm	15.7 (2.6)	15.9 (1.9)	16.1 (1.6)	**16.2** (1.8)	16.0 (2.2)	15.8 (2.1)	16.2 (2.4)	16.8 (1.3)	15.1 (3.6)
SM_DBH	cm	4.5 (1.1)	4.6 (0.9)	**4.4** (0.9)	4.5 (1.1)	4.3 (1.2)	4.7 (1.1)	4.6 (0.9)	3.9 (0.4)	4.3 (1.0)

APPENDIX 4.4. Continued.

Variable[A]	Measurement	All sites	Mouse, h	Rat, b	Rat, c	Rat s-b	Shrew, b-t	Shrew, l-c	Shrew, l-t	Shrew, p
HT:DBH	m/cm	0.46 (0.12)	0.38 (0.13)	0.43 (0.12)	**0.43** (0.11)	**0.50** (0.10)	**0.52** (0.08)	**0.42** (0.12)	**0.57** (0.06)	0.41 (0.11)
SRB_COV	cm	165.9 (172.3)	107.8 (124.1)	177.4 (154.9)	202.5 (211.3)	162.2 (138.2)	141.7 (127.9)	210.2 (213.6)	148.3 (132.4)	525.4 (467.5)
SRB_EDG	line intercept	4.3 (4.0)	5.9 (4.5)	5.4 (3.3)	**5.6** (3.4)	3.8 (3.3)	**2.8** (2.9)	5.0 (4.7)	3.2 (2.7)	4.1 (3.8)
BAM_COV	cm	348.5 (639.5)	132.2 (368.7)	218.3 (716.2)	321.5 (710.2)	275.2 (529.7)	**465.3** (612.0)	260.8 (549.0)	199.2 (445.4)	**168.6** (392.8)
FRN_COV	cm	774.0 (6912.4)	**393.4** (590.3)	709.0 (623.0)	673.9 (592.5)	**940.2** (722.3)	**935.2** (656.0)	736.3 (706.8)	**1442.5** (474.5)	525.4 (467.5)
LOG	# /50m^2	2.4 (2.5)	**0.6** (1.0)	2.0 (2.0)	2.2 (2.3)	**3.2** (2.5)	**3.1** (2.4)	2.1 (2.0)	**4.8** (2.0)	**1.0** (1.9)
BLDR	# /50m^2	2.2 (1.4)	1.8 (1.2)	1.8 (1.1)	2.5 (1.2)	2.5 (1.3)	**3.0** (1.2)	2.0 (1.4)	1.8 (1.6)	**1.6** (1.4)
PAST	count of quadrants	1 (1.4)	**2.1** (1.6)	1.3 (1.5)	27.6 (35.1)	0.7 (1.2)	**0.2** (0.5)	1.3 (1.6)	0.5 (0.8)	1.2 (1.3)
HEDGE	m /9 ha	8.8 (27.1)	**37.8** (48.7)	16.6 (41.6)	10.5 (28.2)	4.1 (17.3)	**0** (0)	4.9 (13.6)	0 (0)	**24.2** (40.7)
STUMP	# /50m^2	12.7 (11.1)	10.2 (9.9)	13.9 (11.4)	**15.1** (11.2)	13.5 (8.8)	11.4 (8.1)	13.8 (9.6)	17.7 (10.7)	12.5 (12.3)
CUT	# /100 trees	23.7 (22.7)	38.0 (28.9)	**35.3** (21.8)	25.9 (25.3)	**15.4** (16.1)	**12.0** (9.2)	28.5 (24.5)	18.1 (7.5)	32.3 (23.3)
LITTER	mode: 0-3	3	**1**	3	3	3	**3**	3	3	**3**
MOSS	mode: 0-3	3	2	**2**	3	**3**	**3**	3	3	**2**
FORBES	mode: 0-3	3	3	3	**3**	3	**2**	**3**	3	3

APPENDIX 4.4. Continued.

Variable[A]	Measurement	All sites	Mouse, h	Rat, b	Rat, c	Rat s-b	Shrew, b-t	Shrew, 1-c	Shrew, 1-t	Shrew, p
GRASS	mode: 0-3	1	1	1	1	0	**0**	1	0	1
PATH	m /9 ha	32.5 (36.4)	41.3 (33.7)	36.4 (39.9)	27.6 (35.1)	25.8 (28.2)	**18.5** (27.6)	34.5 (35.9)	41.3 (27.1)	**50.1** (36.4)
SP_RICH	# /12 trees	5.7 (1.8)	5.2 (1.5)	5.1 (1.5)	5.8 (1.7)	5.4 (1.5)	**6.3** (1.5)	5.3 (1.6)	5.2 (0.9)	5.1 (1.8)
FAGACEA	# /100 trees	4.3 (6.6)	3.7 (8.0)	0.2 (0.4)	2.8 (6.3)	4.0 (4.9)	5.9 (6.2)	4.6 (6.5)	5.6 (3.9)	3.7 (6.7)
ERICACEA	# /100 trees	8.3 (14.8)	13.0 (14.2)	0.8 (1.8)	10.4 (17.6)	10.8 (18.7)	5.3 (9.2)	11.0 (19.1)	2.8 (6.2)	7.3 (10.4)
LAURACEA	# /100 trees	9.7 (14.3)	2.8 (5.6)	0.4 (0.6)	8.8 (11.6)	9.4 (12.4)	18.3 (19.4)	5.7 (9.4)	8.3 (8.3)	4.7 (13.6)
THEACEA	# /100 trees	32.2 (21.0)	20.4 (20.1)	4.5 (0.6)	32.9 (20.9)	41.5 (19.6)	35.0 (21.5)	38.8 (20.4)	50.0 (10.8)	28.7 (23.0)
BA_ACECAM	m^2/ha	4.4 (28.8)	10.6 (29.9)	36.3 (177.8)	406.1 (1598.9)	**22.7** (141.7)	**151.1** (370.4)	152.3 (668.9)	0 (0)	**0** (0)
BA_ALACHI	m^2/ha	0.6 (5.4)	0 (0)	0 (0)	10.8 (77.9)	12.3 (76.6)	33.5 (153.9)	0 (0)	0 (0)	35.2 (172.6)
BA_ALNNEP	m^2/ha	0.7 (4.6)	33.2 (93.8)	9.7 (47.7)	39.7 (150.7)	119.0 (627.3)	**0** (0)	3.5 (21.2)	0 (0)	79.1 (287.5)
BA_BERARI	m^2/ha	10.4 (31.1)	**1598.2** (2130.4)	720.9 (1793.3)	658.1 (1681.1)	275.0 (1033.6)	**172.9** (1092.9)	431.7 (906.7)	0 (0)	396.0 (1023.5)
BA_CASHYS	m^2/ha	0.2 (2.9)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	9.2 (55.4)	0 (0)	70.6 (288.5)
BA_DAPBHO	m^2/ha	0.1 (0.6)	0 (0)	0.7 (2.6)	1.3 (5.5)	0.2 (0.0)	1.6 (6.3)	1.9 (6.4)	0 (0)	0.4 (1.1)

APPENDIX 4.4. Continued.

Variable[A]	Measurement	All sites	Mouse, h	Rat, b	Rat, c	Rat s-b	Shrew, b-t	Shrew, l-c	Shrew, l-t	Shrew, p
BA_EURACU	m^2/ha	16.1 (39.6)	737.7 (1848.6)	511.3 (766.5)	549.2 (1091.4)	261.7 (893.3)	158.1 (332.6)	703.9 (1591.0)	369.1 (723.2)	822.7 (1297.6)
BA_FICNER	m^2/ha	1.7 (6.9)	199.7 (455.5)	**7.1** (34.6)	35.2 (200.9)	73.1 (332.6)	90.3 (286.9)	49.2 (181.7)	0 (0)	**394.4** (1270.2)
BA_HYDHET	m^2/ha	1.6 (5.4)	1.1 (2.3)	26.0 (87.4)	46.6 (142.6)	115.3 (274.4)	73.9 (202.0)	98.7 (254.4)	224.5 (415.7)	45.1 (149.5)
BA_ILESIK	m^2/ha	3.1 (22.6)	0 (0)	96.1 (368.4)	97.2 (574.2)	120.1 (491.3)	187.7 (569.2)	23.9 (106.3)	0 (0)	0 (0)
BA_LINASS	m^2/ha	1.5 (9.4)	0 (0)	0 (0)	17.9 (111.9)	78.1 (357.6)	61.5 (286.2)	4.6 (28.3)	0 (0)	0.8 (3.8)
BA_LINPUL	m^2/ha	10.0 (83.6)	83.8 (237.1)	52.8 (258.6)	355.9 (1480.2)	227.6 (670.2)	**948.4** (4105.4)	185.9 (805.3)	0 (0)	0 (0)
BA_LITELO	m^2/ha	8.6 (24.5)	336.7 (952.3)	**47.5** (161.2)	312.5 (764.5)	430.1 (1245.8)	**641.0** (1027.5)	244.3 (687.6)	302.8 (429.3)	118.4 (312.3)
BA_LYOOVA	m^2/ha	27.7 (92.0)	1392.1 (3117.4)	1156.2 (3394.1)	1410.2 (3576.1)	671.8 (1234.5)	621.8 (1778.3)	1615.0 (3857.5)	440.1 (984.1)	644.2 (1329.0)
BA_MAGCAM	m^2/ha	2.3 (20.3)	0 (0)	0 (0)	19.8 (131.1)	441.6 (2757.6)	449.0 (2723.7)	2.3 (13.8)	0 (0)	0 (0)
BA_MELPIN	m^2/ha	3.0 (12.7)	4.3 (12.1)	36.1 (108.2)	6.3 (30.4)	13.6 (82.8)	109.3 (334.1)	74.2 (278.3)	2.1 (4.7)	57.8 (275.8)
BA_MICKIS	m^2/ha	3.6 (22.8)	0 (0)	26.3 (95.7)	8.5 (61.5)	5.1 (32.0)	347.0 (1790.1)	455.6 (2194.3)	34.2 (76.4)	0 (0)
BA_MYRSEM	m^2/ha	0.9 (6.3)	0 (0)	0 (0)	5.7 (36.5)	5.1 (27.4)	6.6 (41.0)	1.1 (6.2)	0 (0)	0 (0)
BA_PERCLA	m^2/ha	20.4 (45.7)	**0** (0)	360.6 (840.0)	522.8 (1611.1)	680.5 (1780.8)	**789.8** (1134.5)	**290.4** (943.5)	1661.4 (2006.1)	**221.6** (847.4)

APPENDIX 4.4. Continued.

Variable[A]	Measurement	All sites	Mouse, h	Rat, b	Rat, c	Rat s-b	Shrew, b-t	Shrew, l-c	Shrew, l-t	Shrew, p
BA_PERDUT	m^2/ha	3.2 (40.0)	0 (0)	72.3 (354.4)	77.1 (430.6)	0 (0)	7.4 (39.8)	272.2 (1647.3)	0 (0)	0 (0)
BA_PRUVEN	m^2/ha	2.1 (14.6)	0 (0)	0 (0)	116.3 (497.8)	100.9 (561.9)	64.0 (292.8)	0 (0)	0 (0)	143.3 (702.0)
BA_QUELAM	m^2/ha	12.0 (37.7)	106.8 (302.2)	238.7 (1136.8)	549.5 (1744.9)	793.2 (2164.1)	**653.9** (1876.6)	654.0 (1845.2)	**1749.2** (3347.1)	262.2 (805.8)
BA_QUEOXY	m^2/ha	11.5 (48.8)	209.9 (593.6)	21.4 (104.0)	**205.1** (1431.3)	671.4 (1931.3)	839.9 (2235.7)	674.0 (2325.1)	0 (0)	794.7 (2705.0)
BA_RHOARB	m^2/ha	4.6 (18.3)	181.5 (366.0)	132.1 (416.4)	247.7 (828.4)	**167.2** (400.4)	72.2 (242.0)	60.8 (327.1)	4.7 (10.5)	76.5 (306.8)
BA_SYMRAM	m^2/ha	0.6 (3.2)	**877.6** (1718.4)	28.3 (138.4)	63.2 (341.6)	0 (0)	0 (0)	76.5 (285.6)	0 (0)	9.1 (44.5)
BA_SYMTHE	m^2/ha	41.8 (59.9)	**273.1** (540.2)	1750.3 (1598.8)	1710.0 (2086.9)	**1828.2** (1418.5)	1189.0 (1358.7)	**1678.4** (1550.2)	**2274.0** (981.0)	582.2 (775.6)
BA_TETFRA	m^2/ha	5.3 (21.4)	0 (0)	182.3 (470.9)	205.4 (638.3)	323.1 (933.9)	**401.0** (950.0)	32.4 (167.2)	0 (0)	**0** (0)
BA_SYMTHE	m^2/ha	41.8 (59.9)	273.1 (540.2)	1750.3 (1598.8)	1710.0 (2086.9)	1828.2 (1418.5)	1189.0 (1358.7)	**1678.4** (1550.2)	2274.0 (981.0)	582.2 (775.6)
BA_TETFRA	m^2/ha	5.3 (21.4)	0 (0)	182.3 (470.9)	205.4 (638.3)	323.1 (933.9)	401.0 (950.0)	**32.4** (167.2)	0 (0)	0 (0)
BA_VIBERU	m^2/ha	16.1 (26.8)	364.1 (391.1)	529.9 (645.1)	388.2 (554.3)	418.4 (601.1)	369.7 (655.0)	383.6 (377.5)	260.3 (161.2)	507.1 (572.7)

[A] See Appendix 4.1 for descriptions.

[B] 36 sample sites in each of seven 9-ha plots.

APPENDIX 4.5. Factor coordinates for bird species on PCA ordination axes.

Species	Axis I *Disturbance*	Axis II *Woody Plant Basal Area*	Axis III *Shrub/Understory Density*
Babbler, black-eared shrike	-1.52389	1.78821	0.12838
Babbler, black-headed shrike	-3.68901	-2.06886	-1.52159
Babbler, green shrike	2.12070	3.48601	-0.41089
Babbler, pygmy wren	-1.01779	1.20374	0.06538
Babbler, rufous-capped	0.20794	-1.58449	1.64212
Babbler, rufous-throated wren	-2.93122	-0.56061	-1.07067
Babbler, streak-breasted scimitar	-0.67653	1.01942	0.99007
Babbler, scaly-breasted wren	-2.14647	0.82949	0.04588
Barbet, great	-2.64858	-2.08210	-0.04485
Blackbird, grey-winged	3.59555	2.52442	0.73934
Bulbul, striated	-1.06547	0.62967	-0.15877
Bushchat, grey	5.95136	-3.42801	-0.98453
Cuckoo, Eurasian	0.10158	-2.16562	0.26604
Cuckoo, large hawk	0.56872	0.36301	0.53862
Drongo, ashy	2.70191	-1.03532	1.81249
Fantail, yellow-bellied	-2.78962	-0.49623	-0.34572
Flowerpecker, fire-breasted	0.34698	-0.71250	4.41714
Flycatcher, grey-headed	-2.57193	-0.08426	0.92400
Flycatcher, pygmy blue	-2.51316	0.09320	-0.21313
Flycatcher, rufous-gorgeted	-0.83319	0.64354	-1.04147
Flycatcher, slaty-backed	-1.97673	-0.27465	-0.54879
Flycatcher, snowy-browed	-2.40334	0.62211	0.11722
Flycatcher, verditer	4.23052	-0.79545	-0.04020
Fulveta, rufous-winged	-0.32495	1.04827	-0.03848
Fulveta, white-browed	0.50117	0.26571	-1.12514
Laughingthrush, chestnut-crowned	0.34742	0.57962	0.09670

APPENDIX 4.5. Continued.

Species	Axis I *Disturbance*	Axis II *Woody Plant Basal Area*	Axis III *Shrub/Understory Density*
Laughingthrush, striated	-2.51941	-1.42034	-0.56329
Laughingthrush, streaked	2.32263	-5.31514	-1.32643
Minla, blue-winged	-0.34413	0.70304	-0.65150
Minla, chestnut-tailed	-1.75140	-0.12425	-1.19620
Niltava, rufous-bellied	-1.44538	0.57251	-0.22400
Nuthatch, white-tailed	-2.94321	0.14338	-0.24092
Partridge, hill	-3.32910	-1.21053	-0.40158
Pheasant, kalij	4.80786	3.94505	-1.82388
Pipit, olive-backed	6.25962	-2.26832	-2.92190
Robin, India blue	3.15931	2.29041	0.51537
Robin, white-tailed	0.10235	1.66610	0.58392
Shortwing, white-browed	-1.59107	0.45915	-0.23848
Sibia, rufous	-0.80072	0.64339	-0.01150
Sunbird, green-tailed	-1.30990	0.28922	-0.40176
Tesia, chestnut-headed	-1.20889	0.86427	0.12377
Tesia, grey-bellied	-4.42675	-1.49428	0.23415
Tit, black-throated	2.88338	1.24361	0.52800
Tit, green-backed	5.68408	-0.57012	-1.44202
Warbler, ashy-throated	2.09994	-1.71436	5.07200
Warbler, brownish-flanked bush	2.09994	-1.71436	5.07200
Warbler, golden-spectacled	-1.05917	0.34618	-0.51394
Warbler, grey-hooded	1.14258	0.58900	-0.30373
Yuhina, stripe-throated	0.43581	0.49447	-1.23348
Yuhina, whiskered	-0.86118	0.92466	0.16738

APPENDIX 4.6. Factor coordinates for small mammals on PCA ordination axes.

Species	Axis I *Disturbance*	Axis II *Woody Shrub Density*	Axis III
Mouse, house	3.57641	-.076123	1.50527
Rat, chestnut	-0.90629	1.73501	0.34801
Rat, brown	1.02406	1.52741	-1.18863
Rat, smoke-bellied	-2.09492	0.12092	-0.21567
Shrew, brown-toothed	-4.42005	-1.98681	0.19420
Shrew, pygmy	2.96733	-1.89180	-1.13637
Shrew, large-clawed	-0.14655	1.25650	0.49319

APPENDIX 4.7. Similarity[A] of understory passerine abundances in 1993 and 1994 at Chitre Kharka and Hile study plots.

	Chitre Kharka		Hile	
Species	1993	1994	1993	1994
Shortwing, white-browed	0.5	0.0	6.0	5.0
Robin, Indian blue	18.0	10.0	5.0	7.0
Babbler, scaly-breasted wren	0.0	1.0	4.0	3.0
Babbler, pygmy wren	2.0	1.5	3.0	2.0
Bushchat, grey	2.0	2.0	0.0	0.0
Tesia, chestnut-headed	2.0	2.0	10.0	9.5
Tesia, grey-bellied	0.0	0.0	0.0	0.0

[A] Man-Whitney U, $z_{0.05}$ = 0.192 (Chitre Kharka), 0.192 (Hile).