

Patterns of bird distribution and commonness based on data from bird checklists

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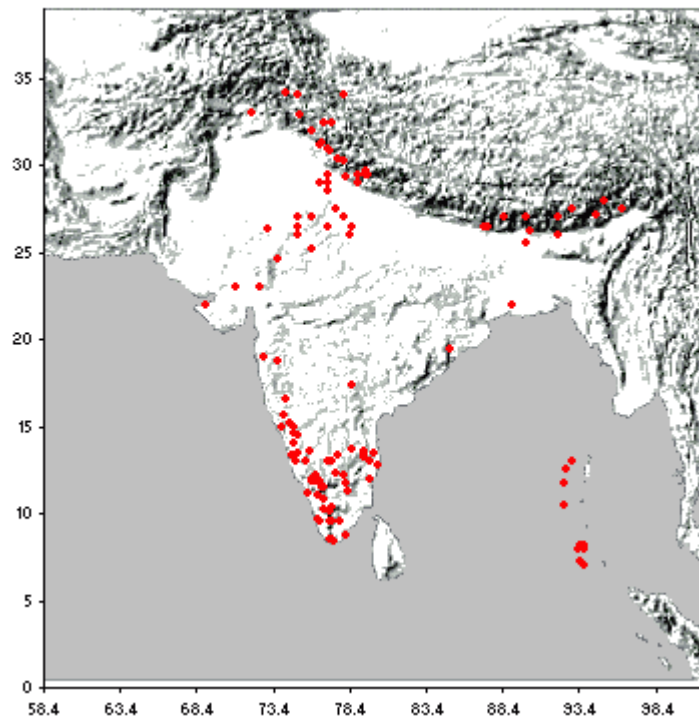
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Do we really know how our birds are distributed? Can distribution maps be automatically generated from checklists made by birdwatchers? Is it possible to obtain any other useful information from such data?

To try and answer these questions, I first tabulated all the checklists that I could find into a form amenable to analysis. The checklists were gathered from the Newsletter for Birdwatchers', The Journal of the BNHS and the Internet. About 300 lists were collected and data entered into a spreadsheet file, with a column for each checklist and rows representing species. I standardized all the species names in the checklists to follow the BNHS-Envis list. The BNHS-Envis species list does not attempt to separate or validate sub-species. Some well-marked sub-species were separated out into extra rows so as not to lose such information from the checklists. The added sub-species include the White-throated race of the Orange-headed thrush (*Zoothera citrina cyanotus*) and the White-headed race of the Grey-headed Starling (*Sturnus malabaricus blythi*). The total number of rows corresponded to 1344 forms (species + subspecies). If a species (=form) was present in a checklist it was marked with a '1' on the row corresponding to the species and the column corresponding to the checklist. In some cases the checklists indicated true numbers of each species seen and in these cases the actual number of birds seen was used instead of just the '1' to indicate presence. For each checklist, the location name, date, source/reference, an estimate of the time taken to make the list and where possible the latitude and longitude were also entered.

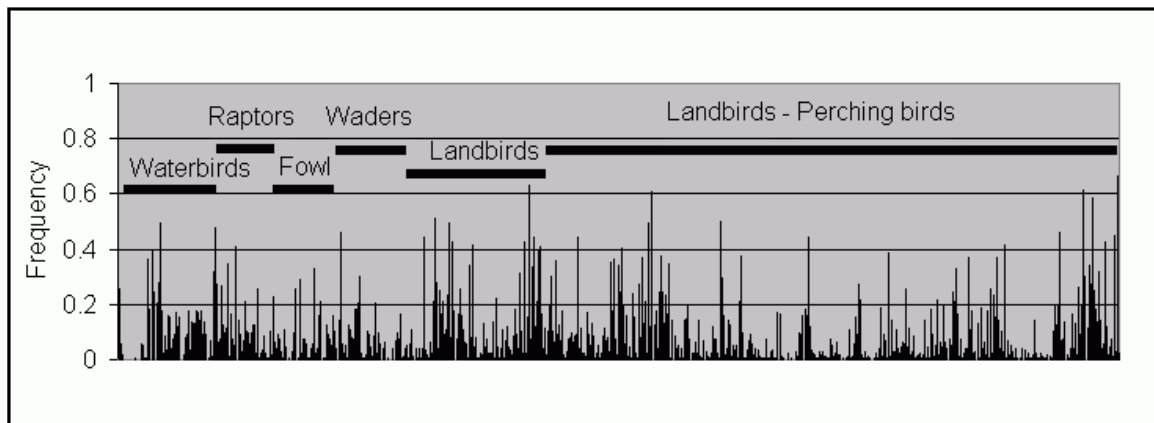
A spot map of the checklist locations was made by plotting the coordinates onto a map. The map however is distorted due to lack of correction for the map projection.

Locations covered by checklists

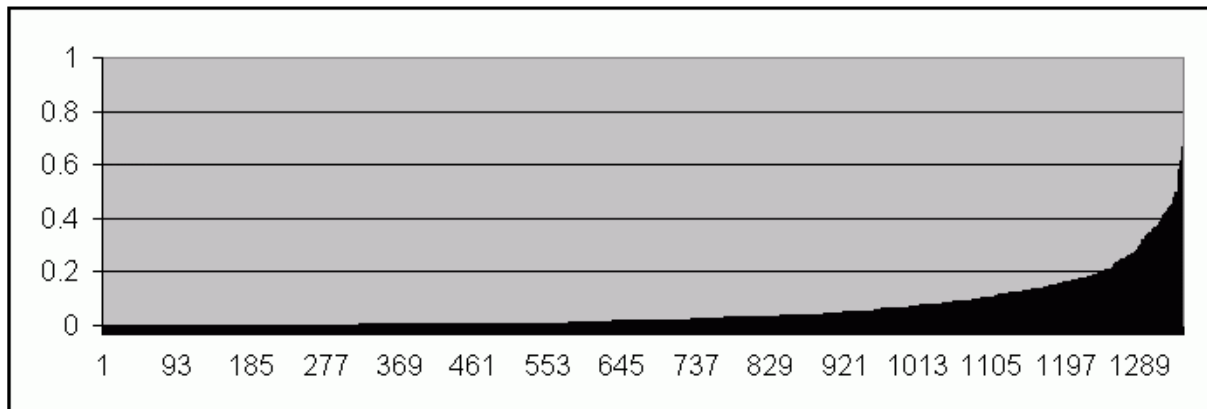


From this collected data it is possible to generate spot distribution maps for any species. The resolution and coverage of these maps being dependent on the availability of checklists. The map shows the lack of a good network of observers from which to obtain accurate distribution information.

The relative frequency of occurrence of a species is an indicator of its commonness. When a histogram is plotted with the species as given in the BNHS-Envis list, we see a pattern that suggests that most bird groups have a few species that are common while most of the others are rarer.



When the same is plotted with the species ordered by the frequency of occurrence, we get the following skewed distribution. Less than a tenth of all species have a frequency of occurrence greater than 0.2 (ie. the bird is noted in more than 1 in 5 checklists).



A countrywide list of the most frequently seen species is as follows. The presence of several species from the forests of the Western Ghats is possibly due to more data being available for southwestern India than for other less ‘interesting’ or less accessible birding areas.

<i>Corvus macrorhynchos</i> Wagler, 1827	0.665254
<i>Halcyon smyrnensis</i> (Linnaeus, 1758)	0.631356
<i>Acridotheres tristis</i> (Linnaeus, 1766)	0.614407
<i>Pycnonotus cafer</i> (Linnaeus, 1766)	0.610169
<i>Dicrurus macrocercus</i> Vieillot, 1817	0.584746
<i>Streptopelia chinensis</i> (Scopoli, 1786)	0.512712
<i>Copsychus saularis</i> (Linnaeus, 1758)	0.5
<i>Psittacula krameri</i> (Scopoli, 1769)	0.495763
<i>Pycnonotus jocosus</i> (Linnaeus, 1758)	0.495763
<i>Ardeola grayii</i> (Sykes, 1832)	0.491525
<i>Milvus migrans</i> (Boddaert, 1783)	0.478814
<i>Passer domesticus</i> (Linnaeus, 1758)	0.461864
<i>Vanellus indicus</i> (Boddaert, 1783)	0.457627
<i>Corvus splendens</i> Vieillot, 1817	0.449153
<i>Columba livia</i> Gmelin, 1789	0.444915
<i>Dinopium benghalense</i> (Linnaeus, 1758)	0.444915
<i>Merops orientalis</i> Latham, 1801	0.440678
<i>Turdoides striatus</i> (Dumont, 1823)	0.440678
<i>Psittacula cyanocephala</i> (Linnaeus, 1766)	0.427966
<i>Dendrocitta vagabunda</i> (Latham, 1790)	0.427966
<i>Alcedo atthis</i> (Linnaeus, 1758)	0.423729
<i>Centropus sinensis</i> (Stephens, 1815)	0.415254
<i>Zosterops palpebrosus</i> (Temminck, 1824)	0.415254
<i>Upupa epops</i> Linnaeus, 1758	0.411017
<i>Accipiter badius</i> (Gmelin, 1788)	0.40678
<i>Motacilla cinerea</i> Tunstall, 1771	0.402542
<i>Egretta garzetta</i> (Linnaeus, 1766)	0.389831
<i>Coracias benghalensis</i> (Linnaeus, 1758)	0.389831
<i>Orthotomus sutorius</i> (Pennant, 1769)	0.385593
<i>Saxicola caprata</i> (Linnaeus, 1766)	0.377119

Aegithina tiphia (Linnaeus, 1758)	0.372881
Pericrocotus flammeus (Forster, 1781)	0.368644
Parus major Linnaeus, 1758	0.368644
Nectarinia asiatica (Latham, 1790)	0.368644
Phalacrocorax niger (Vieillot, 1817)	0.364407
Hirundo daurica Linnaeus, 1771	0.364407
Megalaima haemacephala (P.L.S. Müller, 1776)	0.360169
Bubulcus ibis (Linnaeus, 1758)	0.355932
Hirundo rustica Linnaeus, 1758	0.351695
Spilornis cheela (Latham, 1790)	0.347458
Lanius schach Linnaeus, 1758	0.347458
Eudynamys scolopacea (Linnaeus, 1758)	0.34322
Motacilla maderaspatensis Gmelin, 1789	0.338983
Oriolus oriolus (Linnaeus, 1758)	0.338983
Ceryle rudis (Linnaeus, 1758)	0.334746
Amaurornis phoenicurus (Pennant, 1769)	0.330508
Terpsiphone paradisi (Linnaeus, 1758)	0.330508
Motacilla alba Linnaeus, 1758	0.322034
Elanus caeruleus (Desfontaines, 1789)	0.317797
Dicrurus paradiseus (Linnaeus, 1766)	0.317797
Apus affinis (J.E. Gray, 1830)	0.313559
Actitis hypoleucos Linnaeus, 1758	0.300847
Megalaima viridis (Boddaert, 1783)	0.300847
Acridotheres fuscus (Wagler, 1827)	0.300847
Saxicoloides fulicata (Linnaeus, 1776)	0.29661
Pavo cristatus Linnaeus, 1758	0.292373
Mesophoyx intermedia (Wagler, 1829)	0.279661
Streptopelia decaocto (Fridvaldszky, 1838)	0.279661
Pericrocotus cinnamomeus (Linnaeus, 1766)	0.275424
Prinia socialis Sykes, 1832	0.275424
Haliastur indus (Boddaert, 1783)	0.271186
Oriolus xanthornus (Linnaeus, 1758)	0.271186
Gyps bengalensis (Gmelin, 1788)	0.266949
Sturnus pagodarum (Gmelin, 1789)	0.262712
Tachybaptus ruficollis (Pallas, 1764)	0.258475
Falco tinnunculus Linnaeus, 1758	0.258475
Phylloscopus trochiloides (Sundevall, 1837)	0.258475
Dicaeum erythrorhynchos (Latham, 1790)	0.258475
Casmerodius albus (Linnaeus, 1758)	0.254237
Gallus sonneratii Temminck, 1813	0.254237
Hierococyx varius (Vahl, 1797)	0.254237
Chalcophaps indica (Linnaeus, 1758)	0.25
Dicrurus leucophaeus Vieillot, 1817	0.25
Ardea cinerea Linnaeus, 1758	0.245763
Streptopelia senegalensis (Linnaeus, 1766)	0.245763
Motacilla flava Linnaeus, 1758	0.245763
Chloropsis aurifrons (Temminck, 1829)	0.245763
Cyornis tickelliae Blyth, 1843	0.245763
Hypsipetes leucocephalus (P.L.S. Muller, 1776)	0.241525
Pernis ptilorhynchus (Temminck, 1821)	0.237288
Coracina macei (Lesson, 1830)	0.237288
Loriculus vernalis (Sparrman, 1787)	0.233051
Lanius cristatus Linnaeus, 1758	0.233051
Nectarinia zeylonica (Linnaeus, 1766)	0.233051

Francolinus pondicerianus (Gmelin, 1789)	0.228814
Athene brama (Temminck, 1821)	0.220339
Prinia inornata Sykes, 1832	0.216102
Ficedula parva (Bechstein, 1792)	0.216102
Phalacrocorax carbo (Linnaeus, 1758)	0.211864
Streptopelia orientalis (Latham, 1790)	0.211864
Treron phoenicoptera (Latham, 1790)	0.211864
Merops leschenaulti Vieillot, 1817	0.211864
Tephrodornis pondicerianus (Gmelin, 1789)	0.211864
Saxicola torquata (Linnaeus, 1766)	0.211864
Culicicapa ceylonensis (Swainson, 1820)	0.211864
Ictinaetus malayensis (Temminck, 1822)	0.207627
Fulica atra Linnaeus, 1758	0.207627
Ardea purpurea Linnaeus, 1766	0.20339
Neophron percnopterus (Linnaeus, 1758)	0.20339
Tringa ochropus Linnaeus, 1758	0.20339
Himantopus himantopus (Linnaeus, 1758)	0.20339
Dicrurus caerulescens (Linnaeus, 1758)	0.20339