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ON ASSIGNING CONSERVATION VALUES TO BIRD SPECIES OF WESTERN GHATS

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1 INTRODUCTION

Whenever Biological Conservation is contemplated, the question that arises first is 'What to Conserve?' Of course it would be best if all life forms are conserved without any discrimination. However, this is not usually possible due to various factors. The chief being socio-economic. It therefore becomes necessary to categorise the various organisms and assign them conservation priority values. This is a major task since one has to be careful not to introduce undue biases which may not give equal chances to each species or community of organisms.

The Nature Conservancy of the United States has made a pioneer attempt in ranking species/communities, by taking into consideration various factors of which rarity and the degree of threat have been held as most important. A species or community may take any value viz, A,B,C or D depending on the above mentioned factors. The species/community (elements) ranked A demand immediate attention while those ranked D ask for none. This system, despite providing a set of very useful guidelines to ranking, seems inadequate. The reason being that in countries/regions where the organisms are poorly known, there will be a lot of inconsistency in the ranks assigned and the whole exercise may end up being merely speculative. To avoid this, therefore, what appears best is a system of assigning numerical values to the elements which will make the priorities rather clear. There can not be any hidden bias or inconsistency in such a system.

Any system of assigning numerical conservation values to elements, in our case birds, should consider the following. If birds are to be saved, habitats are to be first preserved. A locality with unique habitat/species/forms/ a community of birds should gain priority than those with none special. To this end values must be assigned to various localities under consideration for conservation based on the bird communities and habitats they support.

2. CONSERVATION VALUAE TO BIRDS

Each form of bird takes a value by its

1. geographic distribution
2. taxonomy
3. habitat preference
4. degree of threat and
5. ecological role

2. 1. Geographic Distribution

It is important that a bird which is endemic to a locality/region gets higher value than one found all over the world. For a bird found in any locality it is therefore necessary to know whether it is found elsewhere in the country, zoogeographic region and the entire would. Values are assigned directly based on this as follows:

At the universal or Global level 6 zoogeographical divisions defined by Sclater, Oriental level 9 divisions following Tiwari's classification, at country level 8 divisions again following Tiwari

and at Western ghats level 4 divisions are made. The conservation value for each species is given by

$$SV_D = \sum_{i=1}^{4} [((N_i + 1) - a_i) \; W_i]$$

Where N_i = The total number of geographical subdivisions made under each major division viz, Global, Zoogeographic, Country wide, Western Ghats, etc.

a_i = The number of geographical subdivisions where the form is actually distributed

w_i = Weight, a function of land area

SV_D = Species value by distribution

A total of 580 forms of birds identified till today from the Western Ghats and the adjacent coastal areas have been assigned values using the four criteria mentioned above. All the values have been scaled to between 0 and 1. Thus the conservation value for a species takes the form

$$\text{Conservation value} = \frac{SV_D - SV_D \text{ minimum}}{SV_D \text{ maximum} - SV_D \text{ minimum}}$$

Fig. 1a shows the possible distribution of species conservation values as defined by geographical range Fig. 1b shows the distribution of conservation values for 580 bird species of Western Ghats. There are about 30 % of species which are endemic to Western Ghats. 5 percent of bird species of Western Ghats have a very wide geographical distribution.

2.2 Taxonomy : For preserving genetic diversity, the taxonomy of each form of birds is to be understood. Monotype species/family

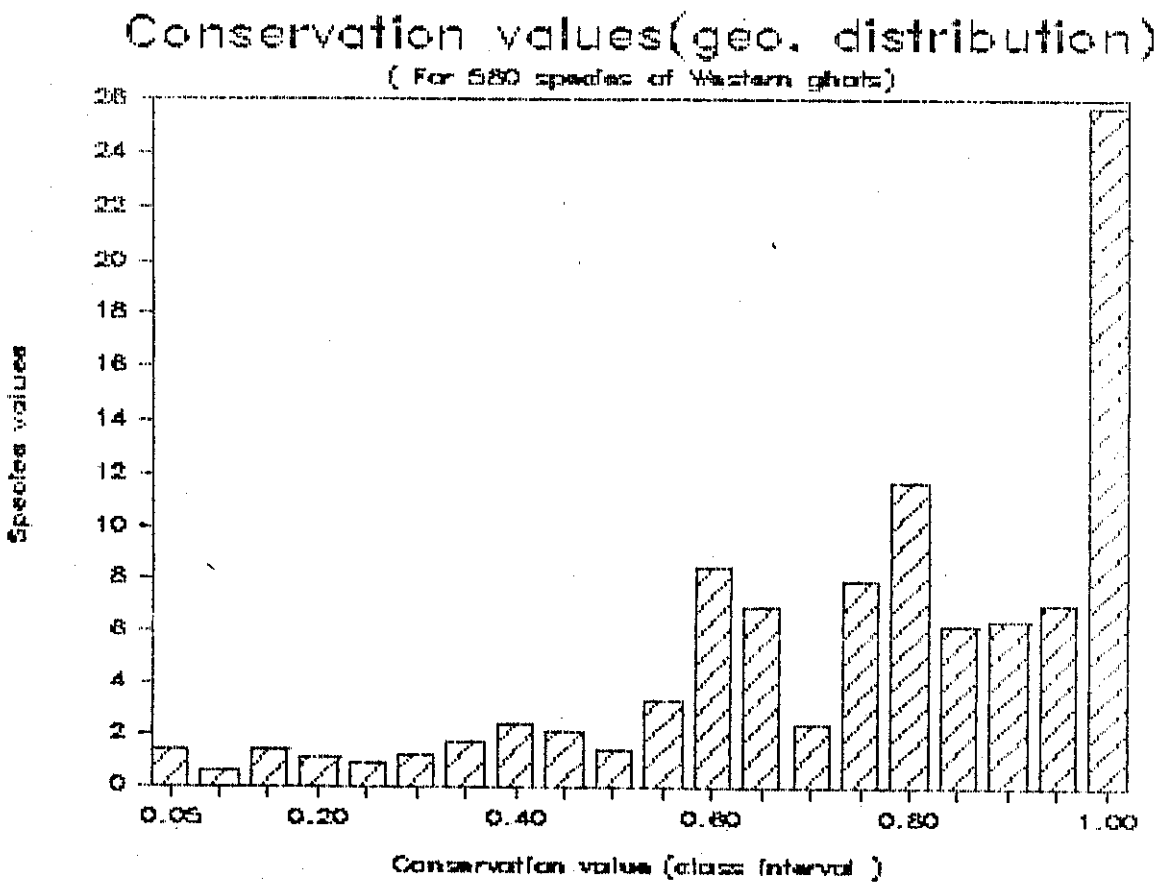
Conservation values(geo. distribution)
(For 580 species of Western ghats)
Species values
26
24
22
20
18
16
14
12
10
8
6
4
2
0
0.05
0.20
0.40
0.60
0.80
1.00
Conservation values (class interval)

Fig 1 (a)

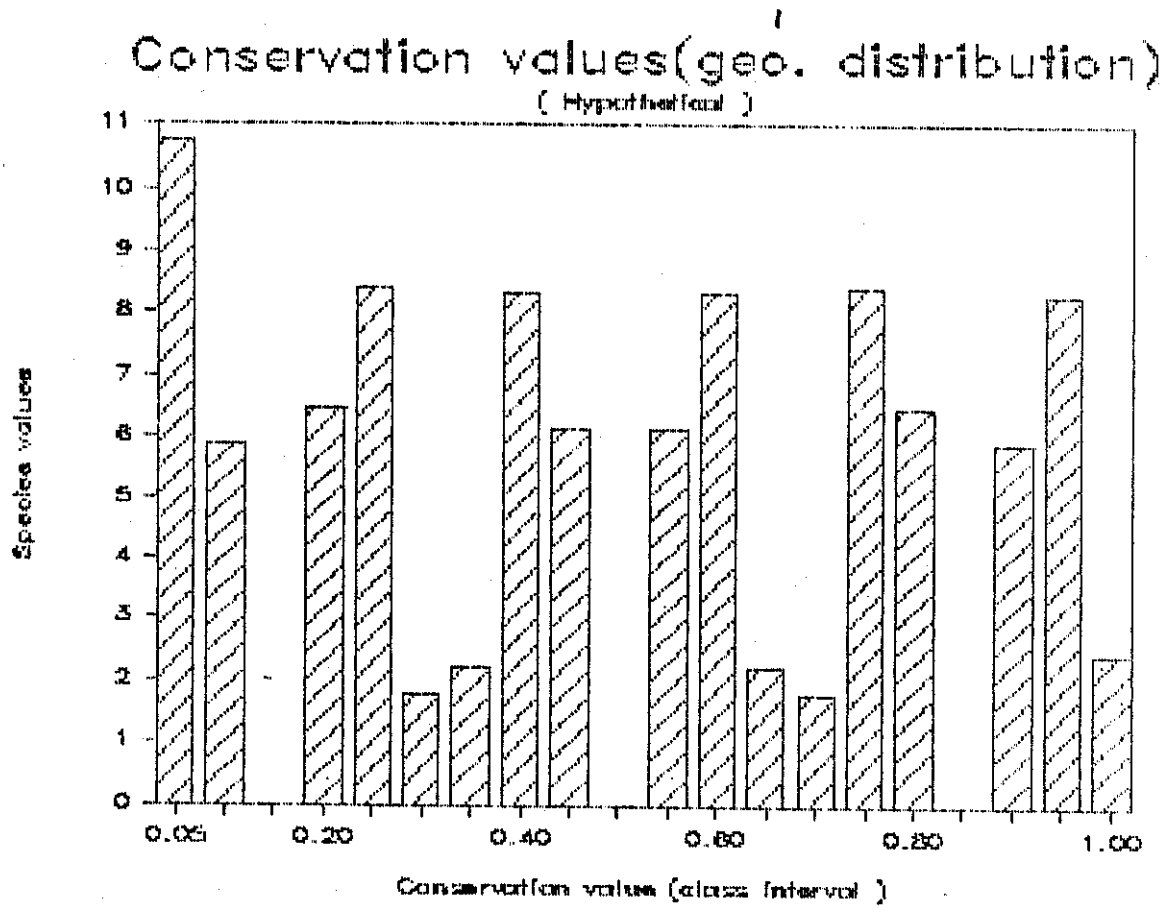
Conservation values(geo. distribution)
(Hypothetical)
Species values
11
10
9
8
7
6
5
4
3
2
1
0
0.05
0.20
0.40
0.80
0.20
1.00
Conservation values (class interval)

Fig 1 & 2

of birds should get more attention than polytypic species/families. Values can be assigned by considering the total number of species described under the family to which the species/form of bird in consideration belongs. Also the total number of subspecies described under that species is to be taken values may be calculated using the equation

$$SV_T = \frac{1}{S \times s}$$

Where S is the total no., of species in that family

s is the total no., of subspecies under that species

SV_T is species value by taxonomy

2.3 Habitat: Forms of birds using several habitat types should get a lesser value than those restricted to a particular type or a few types of habitat only. The values can be calculated using the formula

$$SV_H = e^{-a/N}$$

Where a is the number of habitats used by a form

N is the total number of habitats defined

SV_H is species value by habitat

Fig 2a gives the possible distribution of species conservation values as defined by habitat preference. Fig 2b is the distribution of conservation values by habitat preference for the 580 bird species of Western Ghats. About 45 percent of the bird species have a restricted habitat preference. Around 1.5 percent of the species have a wide range of habitat type preference.

value by

Conservation/~~of~~ Habitat

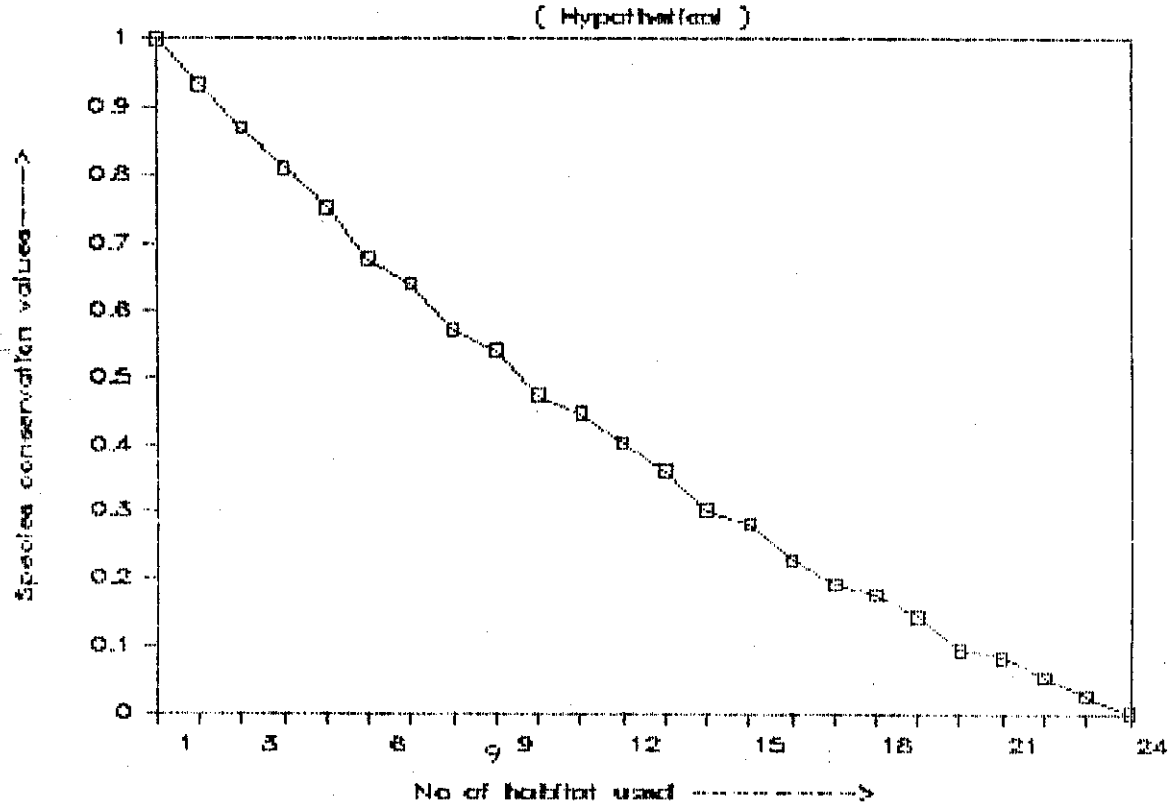

Fig 2a

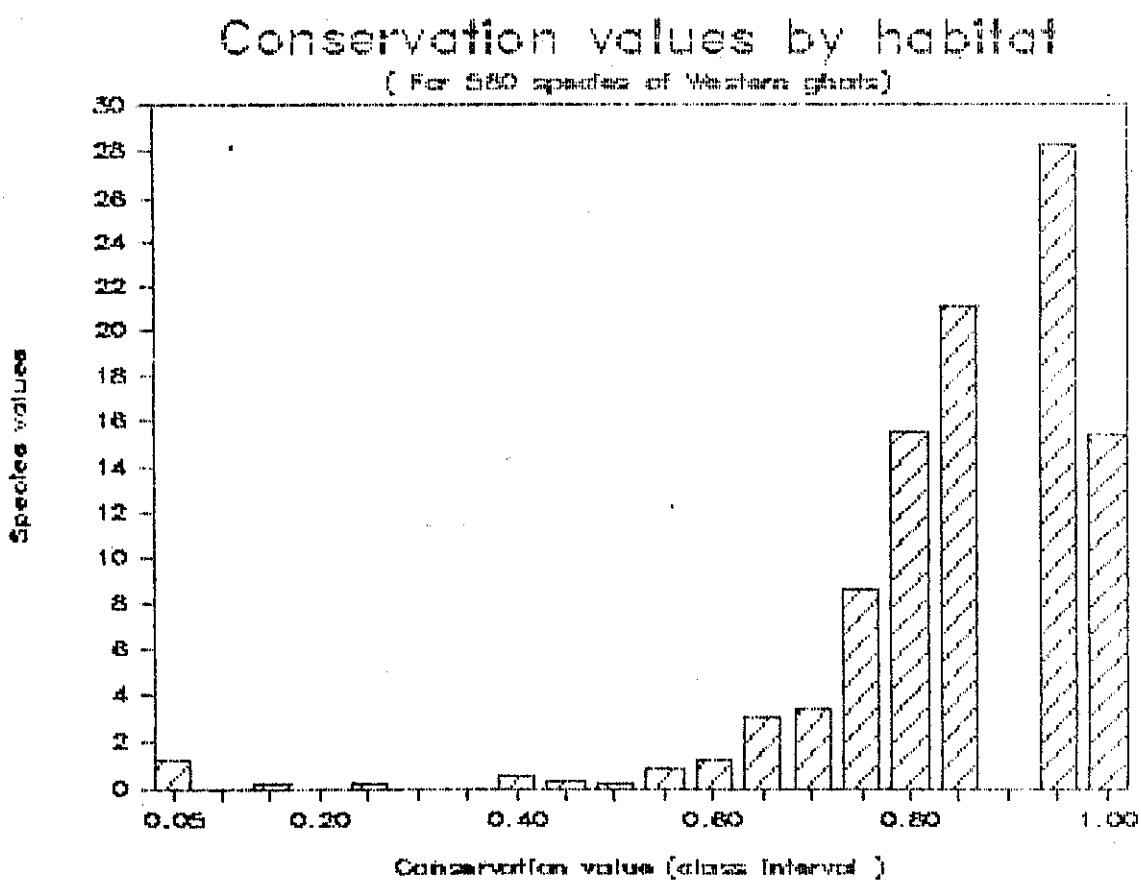
Conservation values by habitat
(For 580 species of Western ghats)
Species values
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
0.05
0.20
0.40
0.60
0.80
1.00
Conservation value (class interval)

Fig 2 b

2.4 Degree of Threat : Conservation values is taken to be higher for birds belonging to families in which a greater proportion of species is endangered. Here the values will be

$SV_E = p_i$ Where p_i is the proportion of endangered species in the family to which the form/species belongs

SV_E is value by endangerment or degree of threat.

2.5 Ecological Roles: Birds with very important roles to play in their habitats or those that play many roles should be valued more. This however can not be readily quantified unlike the above four and requires further work.

Conservation value for a given locality can be given as follows:-

a) Only the species richness is taken into consideration.

$$\text{Conservation value for a locality} = \sum_{i=1}^{n} \text{Conservation value for ith species}$$

Where n is the number of species.

b) Species richness and abundance both are considered

$$\text{Conservation value for a locality} = \sum_{i=1}^{n} F_i \times \text{conservation value for ith species}$$

Where F_i is the No. of individuals in ith species and n is the number of species.

Using the above defined conservation value criteria and formulas, 2 localities from the North Kanara district of Western Ghats namely Bhairumbe and Santagal are given a conservation values. Table 1 gives the conservation values by Geographical distribution

(CVGD), Habitat preference (CVHP), Degree of threat (CVDT), Taxonomic uniquences (CVTU) for Santgal and Bhairumbe.

	Santgla				Bhairumbe			
	CVGD	CVHP	CVDT	CVTU	CVGD	CVHP	CVDT	CVTU
a.	23.00	18.54	0.42	0.12	37.93	30.14	0.55	0.50
b.	98.25	79.06	0.73	0.56	215.15	172.44	4.51	3.36

Conservation Values to Habitats:

While assigning values to the habitats the following are to be considered:

1. The total area
2. Altitude
3. Dominant plant species
4. Regeneration of plant species
5. Indicator plant species
6. Secondary plant species
7. Soil type
8. Water type and distance from the source
9. Level of disturbance-pressure on fallen leaves, soil, timber, due to grazing etc.
10. Pressure from industries, agriculture, reservoirs etc.
11. Catastrophes - landslides, fires, floods etc.

Attempts are being made to quantify each of these and assign values as in the case of birds. the basic principles remain the same. Information is meagre. The habitat values and bird community values decide on the final priorities.