1. The Western Ghats of Indian Peninsula harbours rich amphibian diversity amounting to 128 species that includes frogs, toads and apodans.

2. Out of these, 94 species are endemic to the Western Ghats. Out of 128 species, status of 45 species in Western Ghats is threatened due to various man-made activities and population of some species have showed decline.

3. The frogs (Ranidae) form the bulk of the amphibian species of Western Ghats and this has a sub-family Nyctibatrachinae which comprises 11 species of aquatic frogs exclusively endemic to the Western Ghats.

4. Members of this family are confined to forest habitat and are distributed in forest streams of specific microhabitat.

5. Man made activities, like fragmentation of the habitat, deforestation, agriculture runoff, encroachment of forest for agriculture, siltation, organic mulch gathering has affected the existence of most of the frogs of this sub-family.

6. *Nyctibatrachus aliciae* is one of the members of this family. It is a small aquatic frog (SVL of adult frog: 20 ± 2 mm) confined to core forest mulch filled streams. This frog is distributed in central and southern Western Ghats.

7. The status of this species is Vulnerable due to severe threats on its habitat from man-made activities. There are anecdotal reports on decline of this species in fragmented habitats. Therefore, this species requires an urgent attention for conservation.

8. Understanding the process and pattern of distribution with other ecological details are of immense use in biology of conservation. There are many conservation techniques proposed elsewhere for the conservation of amphibians. Among these, habitat related conservation practices gains more practical applications as these sensitive species rarely respond to other techniques of conservation.
9. The habitat related conservation practices require fundamental knowledge on species distribution, habitat characters, microhabitat requirement of the species and other eco-biological information.

10. In the present study an attempt was made to record the habitat character, distribution and microhabitat requirement of *Nyctibatrachus aliciae* in various types of the forest of central Western Ghats.

11. The study was made at an interval of 30 days for a period of 3 years in 4 sites of Evergreen forest, 2 sites of deciduous forest and one agriculture sites located between 13° 35′—13° 45′ N and 75° 15′—75° 30′ E in central Western Ghats of Chikmagalur and Shimoga Districts of Karnataka State. These sites comprise native habitat, altered habitat and totally fragmented habitats. These sites are RF, BMP, RS (native evergreen forest), KUS (secondary growth in evergreen forest), SSUP and SSDS (deciduous forest – partially altered) and AO (agriculture field).

12. During this study each site was characterized by periodic recording of some selected physico-chemical parameters, *viz.*, air, water, soil and litter temperatures, illuminosity, humidity, pH of water and soil, conductance of water and soil, depth of habitat water and litter on the forest floor, concentration of dissolved oxygen, carbon dioxide, dissolved organic matter, alkalinity of water, water holding capacity, organic carbon and moisture content of soil and tree density and canopy cover of the habitat.

13. Frogs of *N. aliciae* were captured concurrent to record of habitat variables in a distinct quadrate size fixed for each site (10 m X 10 m). Along with this the co-occurring amphibian species were also recorded throughout the study.

14. The habitat variables (all physico-chemical, climatic and vegetation parameter recorded) of different sites were subjected ANOVA to check the differences between sites, which were in turn subjected to UPGMA for making cluster of sites of similar nature. The relationship between density
of *N. aliciae* and habitat variables were checked using co-relation coefficient values and they fit into multiple regression models.

15. The data on frog procured in this study was thoroughly analysed using diversity indices (species richness, Simpson’s diversity index, Shannon-Wiener Diversity index), abundance values and its ranking, Jaccard index of sample similarity and co-occurrence analysis to check the distribution status of the species, its preference to particular habitat etc.

16. Preference of the species to a range of habitat variables is detected using the frequencies of frog occurrence at different incident of sampling.

17. The result of this study reveals that –

a. All the studied sites are unique with reference to some of the physico-chemical and other habitat variables (Table 1).

b. Though, the air and soil temperatures, illuminosity, soil moisture content and canopy cover exhibit differences between sites, their fluctuation in different samplings were in a narrow range among some sites, thus subjecting to UPGMA, there is a formation of distinct cluster of sites (Figure 5a to 5e). This also indicates the magnitude of changes in different studied sites.

18. The diversity indices on total amphibian fauna of these sites revealed that, maximum diversity of 27 spices was recorded in AO, followed by 21 species (BMP and RS), 20 species in KUS, 13 each in RF and SSUP and least(11 species) in SSDS (Table 3).

19. Overall, the studied region has recorded 33 species of anuran amphibians, comprises of 22 species of ranidae, 6 species of rhacophoridae, 3 species of bufonidae and two species of microhylidae (Table 4).

20. *N. aliciae* was found in all sites and the proportion of abundance analyses (Pi) revealed that except in AO (4th place of highest contributor to total abundance) in all other sites this frog is the top contributor to the total abundance of anuran amphibians (Figure 6a — 6g). The contributions of this species to the total abundance were 62.98% (RF), 54.1% (SSDS),
43.42% (SSUP), 42.46% (BMP), 33.73% (RS), 27.52% (KUS) and 10.71% (AO) (Table 12).

21. The Jaccard sample similarity indices (Table 5) revealed that sites RS and KUS, KUS and BMP each had 70.8% sample similarity, followed by KUS and AO (67.9%). The sample similarity of the latter two assemblages could be comparable with UPGMA clusters of sites.

22. The percentage of incidence of occurrence (i.e. frequency of sighting in the total 36 samplings of the study) revealed that this frog is more continuously recorded in the following order -BMP, RF, RS, SSUP, SSDS, KUS and AO (Table 6).

23. The density of this species is found to be maximum in RF, followed by BMP, KUS and other sites (Figure 7), where except in SSDS and SSUP sites, the differences in annual density is statistically significant, indicating the density of this species varied within and between habitat.

24. The population estimate made using Schnabel method revealed that the population size of this species is big in RF followed by KUS, RS and least in SSUP. This indicated that, population of this species is low in altered habitats.

25. *N. aliciae* co–occurred with 22 species of anurans (excluding rhacophoridae members which are arboreal), the important one among these are *N. major* (32.4%), *Rana limnocharis* (31.4%), *Micrixalus saxicola* (30.5%). These frogs were also recorded in the same microhabitat occupied by *N. aliciae*.

26. Influence of physico-chemical parameters/habitat variables on the density of *N. aliciae* was checked with the help of Karl Pearson correlation coefficient (r) (Table 9). The result indicated that the influence of each parameter varied from site to site. But there was prominent influence of litter temperature and water temperature in RF.

27. The UPGMA has clustered the study sites into 4 groups and the density of this frog between these groups showed significant differences.
28. There are more frogs of this species in the groups of native forest sites than those of altered ones.

29. The multiple regression models revealed that canopy cover plays a major role and thicker canopy supports more frogs of this species in the streams. This could be due to the fact that, thick canopy reduces air, water, soil and litter temperatures and also deposits maximum litter and organic mulch which are the microhabitat requirement of the species. Therefore, the role of synergistic factors operating on distribution of this species is apparent.

30. The careful examination of the data from this study revealed that this frog requires low air temperature ranging between 23° C and 29°C, low illuminosity less than 7,000 Lux, low soil temperature ranging between 19°C and 28°C, soil moisture content of 5 to 35% and high canopy cover of 65% to 85%. The preference of such conditions could be easily observed in multiple regression models (Figures 11 – 15) and frequency distribution of these frogs (Figure 16 – 20).

31. Since habitat and microhabitat characters play a major role on distribution of the species and habitat in the studied region is getting derelicted, a few useful conservation tips are proposed. This includes possible habitat restoration and protection considering the preferential range of habitat parameters to the frog, reduction of man made activities causing the damage to the habitat of this species.