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Upward Distribution Shift of *Calochroa flavomaculata* (Hope, 1831) in Great Himalayan National Park Conservation Area

Carabids, subfamily Cicindelinae, commonly known as tiger beetleshave been widely and successfully used for different kinds of indicator studies. Most of the surveys focus on the response of the species to changing environmental conditions (Rainio, 2003). Rapid climate change may prompt species distribution shifts upward and pole ward (Chen *et al*., 2011; Tewksbury *et al*., 2011). Eyre and Luff (1990); Halme and Niemelä (1993); Butterfield (1996) and Niemelae (2001)reported that in forests and grasslands carabids respond quickly to habitat fragmentation, fertilization, forest cutting and grazing as they are sensitive to environmental factors such as temperature, humidity, vegetation, and size of the forest patch in addition to this Niemelae *et al*. (1993) found that ecological requirements of species vary, and consequently, some species are more sensitive to environmental changes than others. In the present study we studied the distribution of the *C. flavomaculata* in the Great Himalayan National Park Conservation Area (GHNPCA).

Study was conducted in the Great Himalayan National Park Conservation Area (Fig. 1), established in 1984, located in Kullu region of Himachal Pradesh. It was added in UNESCO list of World Heritage Sites on 23 June 2014. It includes total area of 1,171 km^2 and altitudinal range of between 1500 and 6000 m above the sea level. The region is highly mountainous and covered with alpine, glacial, temperate, and sub-tropical forests. The ambient temperature varies from -10 to 40°C.

The opportunistic survey has been done throughout the bank of the rivers in the month of April-July 2018 corresponding with the study of Uniyal and Mathur (2000). Beetles were caught with the help of sweep netting. Collected specimens were preserved in 70% ethanol and dry pinned for identification of the species.

A total of 22 individuals of *C. flavomaculata* (Fig. 2) were found during the study. The study showed totally different distribution record, which is more than 2200 m elevation above the sea level *i.e.* 2200-2600 m with

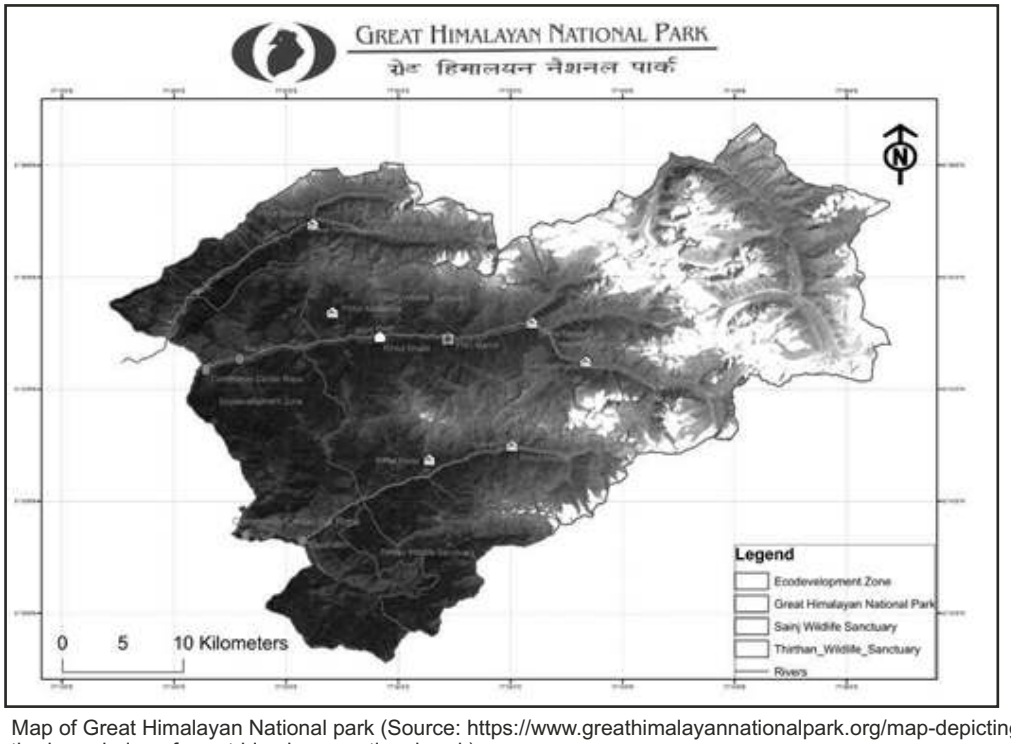

Fig. 1: Map of Great Himalayan National park (Source: https://www.greathimalayannationalpark.org/map-depicting-the-boundaries-of-great-himalayan-national-park)

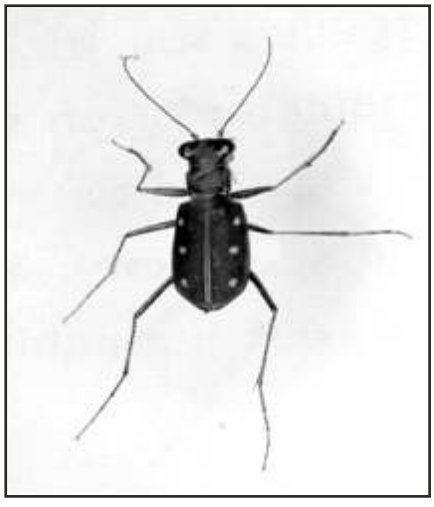

Fig. 2: *Calochroa flavomaculata.*

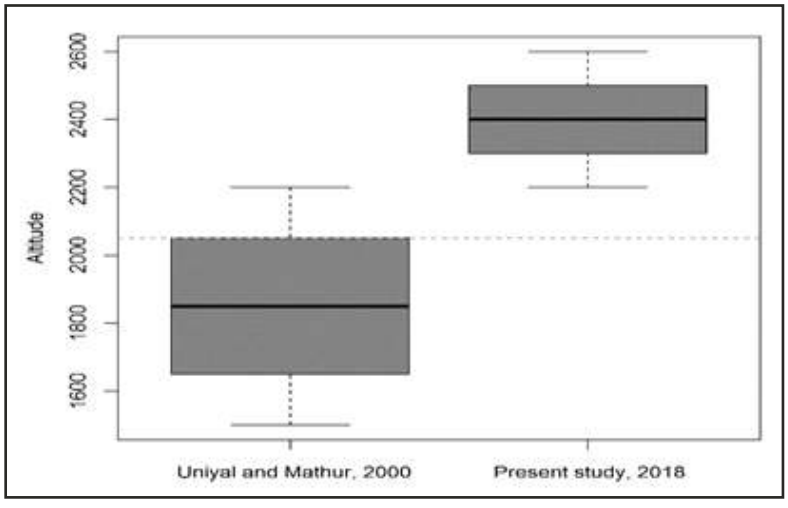

Fig. 3: A graph depicts the Mean (± SD) of elevation

the mean of 2400 m (± 282 m) (Fig. 3) as against the report of Uniyal and Mathur (2000) where the species was considerably found between 1500-2200 m with the mean of 1850 m (± 494 m) elevations. This huge shift of the species may indicate the change in the environment in a period of 18 years (2000 to 2018) due to some unknown factors, which forces this species to change its distribution.

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