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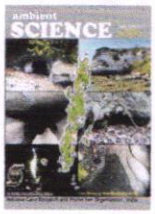

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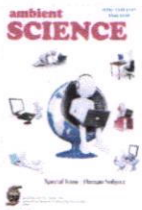

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RESEARCH ARTICLE

A Comparative Description between New Record of Dragonfly *Burmagomphus pyramidalis* Laidlaw from Central India and Earlier Available Record

Ashish D. Tiple[1]*, Shyamkant S. Talmale[2], Sonali V. Padwad[3]

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[2]Zoological Survey of India, Central Zone Regional Centre, Jabalpur-482 002, Madhya Pradesh, India

[3]B1/8 Savitri Vihar, Somalwada, Wardha road, Nagpur -440025, Maharashtra, India.

Study Area: Jabalpur & Hoshangabad District, Madhya Pradesh, India

Coordinates: N 25° 08' 21.48" E 075° 01' 52.52'

Key words: Pachmarhi Biosphere Reserve

Abstract

Burmagomphus pyramidalis Laidlaw, 1922 was reported so far from south to southwest India. Present report of the species from Tropical Forest Research Institute (TFRI) Jabalpur and Pachmarhi Biosphere Reserve (Hoshangabad Dist.), Madhya Pradesh is for the first time from the central parts of India. The study provides here variations in collected *B. pyramidalis* specimens in antehumeral marking on the thorax and the 9th abdominal segment. In specimen two upper antehumeral portion narrow, broaden at middle, again somewhat narrow and broaden at extreme humeral portion touches to the base of 2nd pair of legs, also interrupted at the middle at humeral region as against upper antehumeral portion broad, narrow at middle, and broaden at extreme humeral portion, however, a conspicuous transverse citron yellow band dorsally seen on hind margin. In specimen one 9 abdominal segment with two big yellow triangular marks dorsally present on hind margin. Variations between collected two specimens of *B. pyramidalis* and available description by Fraser (1926 & 1934) are discussed.

Introduction:

The genus *Burmagomphus* was created by Williamson (1907) for a single species, *B. vermiculatus* Martin, earlier described as *Gomphus vermiculatus* (type from Tonkin in Vietnam). Fraser (1934) synonymised Burmese specimens of *vermiculatus* under *williamsoni* Fraser, 1926. Fraser (1934) reported eight species of the genus *Burmagomphus* from the Indian subcontinent (India, Pakistan, Nepal, Bhutan, Bangladesh, Sri Lanka and Myanmar). Schorr & Paulson (2016) in their revised world Odonata list recorded a total of 29 species under the genus distributed throughout the world, but only six species were listed from India viz., *Burmagomphus cauvericus* Fraser, 1926 (Western Ghats), *Burmagomphus hasimaricus* Fraser, 1926 (West Bengal), *Burmagomphus laidlawi* Fraser, 1924 (Western Ghats), *Burmagomphus pyramidalis* Laidlaw, 1922 (Western Ghats), *Burmagomphus sivalikensis* Laidlaw, 1922 (Uttarakhand and West Bengal) and *Burmagomphus vermicularis* (Martin, 1904). The last species *vermicularis* reported first time from Meghalaya, India with doubt by Lahiri (1987) and also Prasad & Varshney (1995) has shown its distribution from Himachal Pradesh and Meghalaya. However, Wilson (2011) and Subramanian (2014) have not shown its distribution in India. Mishra (2007) studied the odonates of Madhya Pradesh and reported a total of 70 species belonging to 40 genera and nine families distributed in different localities. Further, odonates from Madhya Pradesh are documented from Pench National Park and Satpura National Park (Ramakrishna *et al.*, 2006), Kanha National Park (Raju & Narayanan, 2008), Bandhavgarh Tiger Reserve (Mishra, 2009), Pachmarhi Biosphere Reserve (Prasad & Mishra, 2009), Singhori Wildlife Sanctuary (Talmale, 2011), as well as 49 species of odonates with six new records for Madhya Pradesh from the Tropical Forest Research Institute Campus, Jabalpur (Tiple *et al.*, 2012). Tiple (2012) recorded 70 species of odonates from Achanakmar-Amarkantak Biosphere Reserve, Madhya Pradesh and Chhattisgarh, India. Hitherto no species under the genus *Burmagomphus* is so far recorded from Central India (Tiple & Chandra, 2013; Tiple *et al.*, 2013, 2014; Tiple & Koparde, 2015; Dawn & Chandra, 2016). The Tropical Forest Research Institute (TFRI), Jabalpur lies on the bank of the Gour River on

*Corresponding Author: ashishdtiple@yahoo.co.in

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New locality records of a rare Dragonfly *Gynacantha khasiaca* Maclachlan, 1896 (Odonata Aeshnidae) from India

Arajush Payra[1*], Gaurab Nandi Das[1], Aratrik Pal[2], Debarun Patra[3] & Ashish D Tiple[4]

[1]Department of Wildlife and Biodiversity Conservation North Orissa University, Takatpur, Baripada-757003, Odisha, India
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ABSTRACT *Gynacantha khasiaca* Maclachlan, 1896 (Odonata Aeshnidae) is a beautiful dragonfly, distributed mainly in South-eastern Asia. During Odonata survey in different parts of North-Eastern and Eastern India from 2014 to 2016, some specimens of this species were observed and photographed from 6 localities. Present record of this species from Purba Medinipur, West Bengal represents its Southernmost distribution in India.

KEY WORDS Aeshnidae; distribution; dragonflies; observation; Purba Medinipur.

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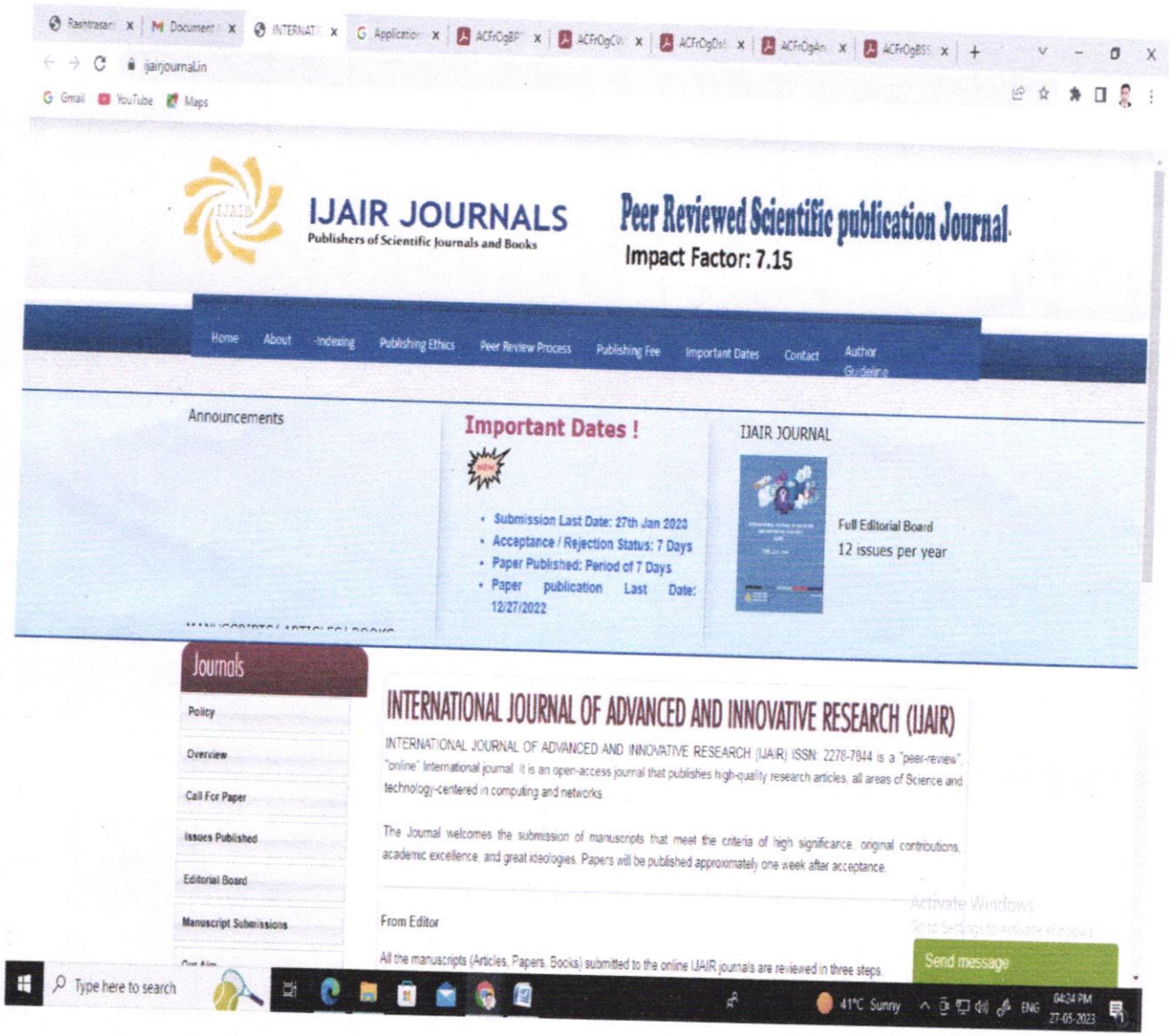
INTRODUCTION

Dragonflies and damselflies (Order Odonata) are the prominent and colorful insects of wetlands with long, slender abdomen, commonly known as aerial predators, hunting by sight. These are mostly found around the vicinity of freshwater habitats like rivers, streams, marshes, lakes and even small pools and rice fields. As predators it plays an important role in wetland and terrestrial food chains. Dragonflies are reliable indicators of overall ecosystem health and also good Biocontrol agents (Andrew et al., 2009; Tiple et al., 2013). Worldwide, 5952 species under 652 genera of odonates have been reported, of which 477 species, 50 subspecies in 142 genera and 18 families are known from India (Subramanian, 2014; Nair & Subramanian, 2014; Kiran et al., 2015; Emiliyamma & Palot, 2016).

Among dragonflies, the genus *Gynacantha* Rambur, 1842 are large in size, pale brown and green in colour and are crepuscular by nature (Fraser, 1936). The genus *Gynacantha* with 92 species is distributed throughout the world, especially in the tropics and subtropics region (Asahina, 1993; Schorr & Paulson, 2016). Among them about 30 species are known from the South-eastern Asia and in India the genus *Gynacantha* is represented only by 13 species (Subramanian, 2014; Khan, 2015a). This distribution range of *G. khasiaca* Maclachlan, 1896 is known from India (Mitra, 2002), Nepal (Vick, 1989) and Myanmar (Fraser, 1936), and possibly Tibet (Martin, 1909), although this record appears to be suspected by Fraser (1936). According to Mitra (2002), Bangladesh has also been included in the range of this species and Recently Khan (2015b) reported the species from Tilagor Eco Park of Bangladesh and confirmed its distribution in Bangladesh.

MATERIAL AND METHODS

The authors have been documenting the Odonata



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INFLUENCE OF MICRO AND MACRO ELEMENTS OF BG-11 MEDIUM ON GROWTH OF CHARACIUM AMBIGUM

Pathade K. N.
Department of Botany, Vidyabharti College, Seloo, Wardha

ABSTRACT

Algae, the groups of phototrophic organisms have been observed widely in many natural habitats. Algae obtained all the nutrients from the water in which they live but, they need a proper supply of these nutrients for their successful growth in the culture medium. Nutrients are the substances or certain elements which are essential for life processes in aquatic organisms.

The influences of macro and micro elements of BG-11 medium on the growth of Characium ambigum were studied and constituted the modified BG-11 medium. The auxenic culture was made in the Advanced Phycology and Hydrobiology research laboratory of Botany Department at RTM Nagpur University, Nagpur. The growth of Characium ambigum (O.D.) was higher in modified BG-11 medium (2.135 OD) than the basic BG-11 media (1.715 OD).

Keywords: Algae, BG-11 medium, Modified BG-11 medium.

INTRODUCTION

The environment is to be conditioned to meet their requirement for the successful growth of an organism. Many attempts have been made to understand the ecological condition suitable for their growth (Ketchum, 1954). The studies on the nutritional requirement of algae are quite similar to higher plants. Nutrients are the substances or certain elements which are essential for life processes in aquatic organisms. Major nutrients include carbon, nitrogen, phosphorus, calcium, sodium, magnesium, potassium, sulphur, nitrogen and iron. Micronutrients those required by plants and animals in very small quantity, might include manganese, copper, zinc, cobalt and molybdenum (Horne and Goldman, 1994). In certain algae some additional elements are required such as silica for diatoms.

The absolute requirement of element can be established only by culture. However, many media have been suggested the culture for the growth of algae in media, a few guidelines have also been suggested by Watanabe, *et.al* (2000) and Warren, *et.al*. (2002). several other media are designed to produce a large population by different authors. Rodhe (1948) and Chu (1942) media designed for growth of algae in artificial condition based on the physiological experiment on forms like *Ankistrodesmus falcatus, Pediastrum boryanum* and others. Gerloff, *et. al.*, (1950) used media and B.G.11 (Rippka, *et al.*, 1979) for blue green algae.

Nutrient requirement must be absolute normal, minimum or optimum. Ketchum (1949) used several media for growth of *Anacystis nidulans*. Allen (1968); Hirano, *et. al*. (1981); Sorensen, *et. al*.(1977); Stein (1966); Ohad, *et. al.* (1967) for Chlorophyceae, Chrysophyceae, Cyanophyceae and Rhodophyceae.

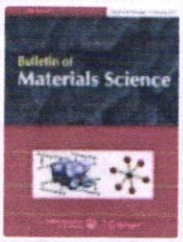
In considering the requirement of nutrients for the growth of individual alga, at sampling sites maximum concentration of elements are present therefore, an attempt has been made to study the individual element and combination of all elements to assess the requirement of nutrients for *Characium ambigum.*

MATERIALS AND METHODS

Algae from different sites were collected, identified and algal cultures were grown in Advanced Phycology and Hydrobiology Laboratory of the Botany Department. From this mixed population a pure unialgal culture was isolated for the study of nutritional requirement of alga. In this investigation *Characium ambigum* is isolated and made auxenic in liquid BG-11 medium. For study of nutritional requirement of algae, BG-11 medium was chosen as it is considered as a basic or control medium for the Cyanophycean and Chlorophycean algae. For nutritional study elements were selected, carbon, nitrogen, calcium, magnesium, sodium, potassium, sulphur and chloride. The growth was estimated in terms of optical density at 678nm of cell suspension with UV spectrophotometer for *Characium ambigum* for an influence of individual element on growth of *Characium ambigum.* Modified medium was made with combination of all elements for individual algal species and observed the growth as compared to basal medium.

RESULT AND DISCUSSION

Carbon is constituent of all organic compounds, protoplasm and enzyme of living system. It is derived from carbon dioxide, carbonates, bicarbonates or organic compounds. In fact some of these investigators depicted role of bicarbonate and carbon dioxide in *Spirulina, Chlorella* and marine diatom *Phaeodyctulum tricoruntum*



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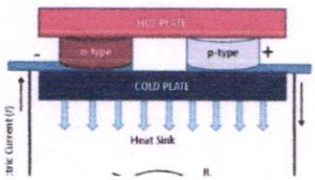

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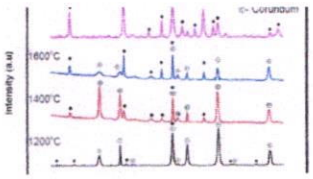

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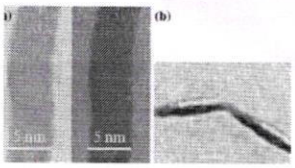

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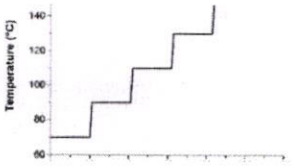

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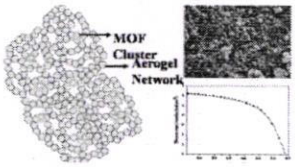

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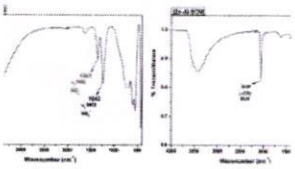

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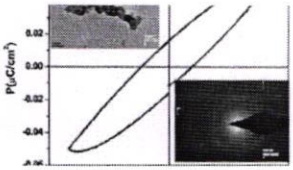

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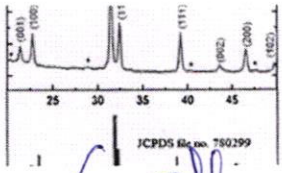

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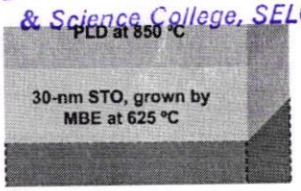

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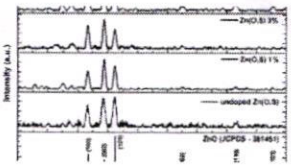

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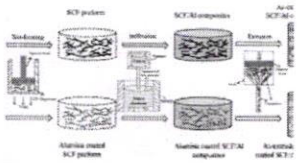

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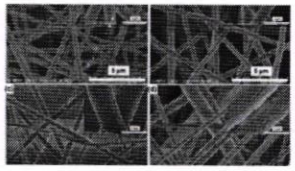

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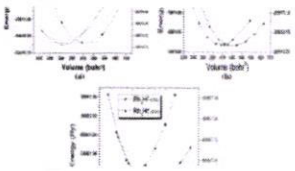

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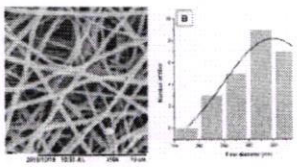

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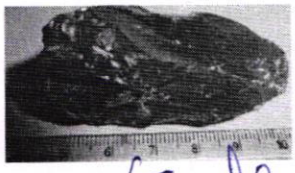

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Influence of the conditions of a solid-state synthesis anode material $Li_4Ti_5O_{12}$ on its electrochemical properties of lithium cells

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A logical explanation of structurally unfit X-ray diffraction peaks in nanoferroelectrics

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Abstract. In the present paper we suggest the cause and solution of some unidentified X-ray diffraction (XRD) peaks in ferroelectric nanoparticles. Indeed, a relationship between the structurally unfit XRD peaks and domains in the ferroelectric nanoparticles is suggested. $BaTiO_3$, $PbTiO_3$ and $Sr_{0.5}Ba_{0.5}Nb_2O_6$ nanoparticles were used as trial samples. Diffraction of X-rays by domain grating was considered for the occurrence of unfit peaks. It was found that domain widths corresponding to some structurally unfit minor peaks of all three trail samples show good agreement to the values estimated from the transmission electron microscopy images. The study can be used to estimate the width of nanodomains (within 5–10 Å) in ferroelectric nanoparticles. Thus, the study seems to be highly important for the advancement of nanoferroelectricity.

Keywords. X-ray diffraction; domains; ferroelectrics; nanoparticles; transmission electron microscopy.

1. Introduction

Inorganic ferroelectric single crystals have been extensively studied for applications like piezoelectric filters, pyroelectric detectors, imaging devices, optical memories, modulators, etc. [1,2]. These applications are due to their excellent dielectric non-linearity, polarization reversal, photorefractive, piezoelectric and domain dynamic properties [1,2]. Despite such prosperous background, as far as the contribution in nanotechnology and nanodevices is concerned, ferroelectrics seem to be lagging behind. This is probably due to the negative results of some initial investigations [3–5].

At the end of last century, Zhong *et al* [3], Chattopadhyay *et al* [4] and Sun *et al* [5] reported that the ferroelectric behaviour disappears when the size of the particles reduces to a nanoscale. Although at later stages such problems were resolved by means of many experimental studies [6–12], progress lagged. Another problem that creates some kinds of hurdles for researchers in the field of nanoferroelectrics is the presence of unknown diffraction peaks in powder X-ray diffraction (XRD) pattern. We also experienced such problems in $BaTiO_3$ and $PbTiO_3$ nanoparticles [9,11]. Up to the limited value of relative intensity, such peaks can be ignored just by stating 'insignificant minor peaks due to weak unknown phase or impurity'. However, the presence of such peaks induces some kinds of uncertainty about the synthesis technique and/or structure of nanoparticles. This may hamper the progress of research in the field of nanoferroelectrics.

Earlier in 1948, Kay [13] observed the effect of twinning on X-ray pattern. He found that due to twinning, the single spots on an X-ray photograph are replaced by pairs or a more complex group. It was also noted in the literature that the microstructure affects the intensity of reflection [14]. Later in 2000, Ingle and Patil [15] suggested that the presence of twin planes is a possible cause of unknown peaks in XRD pattern of ferroelectric material. These evidences indicate that there is a definite effect of twinning and hence domain structures on XRD pattern of the ferroelectrics since twinning process leads to formation of domains in the crystals.

Unfortunately, the matter remained unnoticed and no further correlation on this part of the research is reported. This is mainly because of dimension of domains. In single crystals, generally the dimension of domains is on the order of a micrometre, which is too large as compared with the wavelength of X-rays. Hence, every part of polydomain crystal under the field of view of X-ray beam seems to be a single domain and hence observations of said kind are infrequent. However, in nanoparticles, as the existence of nanodomains with the dimension comparable to the X-ray wavelength is possible, the effect will be frequent if they arrange themselves in a grating-like form. Thus, the interaction between the domains and X-ray can be distinguished.

In the present work, we conducted the titled study on some ferroelectric nanoparticles and a relation between domain structure and unknown XRD peaks was established. The study provides the information of whether small domains on the

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Issue Description

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NEW LOCALITIES OF SQUARE SPOTTED GECKO, HEMIDACTYLUS GRACILIS BLANFORD, 1870 (SQUAMATA: SAURIA: GEKKONIDAE) WITH HABITATS, DISTRIBUTION AND CONSERVATION STATUS, FROM MAHARASHTRA, INDIA

Authors : Parag H. Dandge and Ashish D. Tiple*

Page Nos : 101-106

Description :
Hemidactylus gracilis Blanford 1870 is one of the poorly known endemic geckos from India. Earlier it was reported from Maharashtra (Pune, Yavatmal, Satara and Nashik districts), Madhya Pradesh (Mandala, Shivpuri districts), Chhattisgarh (Raipur) and Andhra Pradesh (Kalavabugga). Hemidactylus gracilis comes under IUCN Least Concern category. We observed that it is common in eastern and central Maharashtra. We studied 11 specimens of Hemidactylus gracilis from different localities and added eleven new localities for Maharashtra. We also provide some data on its distribution, habitat and threats in Maharashtra.

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NEW LOCALITIES OF SQUARE SPOTTED GECKO, *HEMIDACTYLUS GRACILIS* BLANFORD, 1870 (SQUAMATA: SAURIA: GEKKONIDAE) WITH HABITATS, DISTRIBUTION AND CONSERVATION STATUS, FROM MAHARASHTRA, INDIA.

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ABSTRACT:
Hemidactylus gracilis Blanford 1870 is one of the poorly known endemic geckos from India. Earlier it was reported from Maharashtra (Pune, Yavatmal, Satara and Nashik districts), Madhya Pradesh (Mandala, Shivpuri districts), Chhattisgarh (Raipur) and Andhra Pradesh (Kalavabugga). *Hemidactylus gracilis* comes under IUCN Least Concern category. We observed that it is common in eastern and central Maharashtra. We studied 11 specimens of *Hemidactylus gracilis* from different localities and added eleven new localities for Maharashtra. We also provide some data on its distribution, habitat and threats in Maharashtra.

Keywords: *Hemidactylus gracilis*, new locality, distribution, Maharashtra

INTRODUCTION:

The genus *Hemidactylus* Oken 1817 is one of the most species rich genus of the family Gekkonidae. It is widely distributed genera are found in the tropical, subtropical and oceanic islands regions of the world. About 144 species are documented worldwide of genus *Hemidactylus* (Uetz and Hošek 2016). The Indian subcontinent hosts about 30 species (Bauer et al. 2010; Agarwal et al. 2011; Mirza and Sanap 2010; Murthy et al 2015; Dandge and Tiple 2015; Mirza and Raju 2017). *Hemidactylus* has been highly affected by repeated transmarine colonizations, human activity, spontaneous rafting, which have contributed significantly to the unusually wide distribution range (Smid et al., 2013).

Hemidactylus gracilis Blanford 1870 is poorly known endemic geckos of India. *Hemidactylus gracilis* was described by Blanford in 1871 based on specimens collected from southeast Berar and Raipur in Central Province (now in Chhattisgarh) (Smith 1935). *Hemidactylus gracilis* has been reported earlier from Maharashtra (Nagpur, Mahavali, Pune Wai and Alandi, Satara, Chandrapur, Bilimora and Madhya Pradesh (Mandala and Shivpuri). IUCN assessed *Hemidactylus gracilis* is a Least Concern due to wide distribution of the species and its habitats. Some habitats are under threat due to tourism related infrastructure development (Srinivasulu and **Srinivasulu 2013**).

D'Abreu 1928 was reported this species is common at Nagpur. Murthy (1986); Tikadar and Sharma (1992); Sharma (2002) provided some additional localities for *H. gracilis* in Andhra Pradesh (Kalavabugga, Sugalimatta, Gorgyapurum and Hatkeshwar). Notes on habitat, distribution, natural history, reproduction and phylogenetic relationship were given by Baure et al. (2005). Chandra and Gajbe (2005) reported *H. gracilis* from Mandala and Shivpuri in the state of Madhya Pradesh; they also provided additional localities from Sarguja and Raipur, Chattisgarh. Recently Mirza and Sanap (2010) reported *H. gracilis* from 'Nashik', Maharashtra.

The present study is an attempt to examine the 11 new different localities from Maharashtra and also provide some data on its distribution, habitat and threat in Maharashtra.

METHOD AND MATERIAL:

Hemidactylus gracilis was surveyed in different areas of Maharashtra states, India from 2008 to 2016. Opportunistic surveys and sightings were