3.4.3.1: Number of research papers in the Journals notified on UGC website during the last five years

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ORIGINAL ARTICLE

Hydrogen Peroxide Stress Induced in the Marine Cyanobacterium *Synechococcus aeruginosus* and *Phormidium valdarianum*

J. Mohammed Hussain[1] · P. Muruganantham[2] · Khaleel Ahamed Abdul Kareem[3]

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Abstract
Biochemical markers against hydrogen peroxide-induced oxidative stress were developed in marine cyanobacteria under standard laboratory conditions. To find out the ability to cope with different concentrations of hydrogen peroxide, two species of marine cyanobacteria including unicellular and filamentous forms were exposed for shorter duration. *Synechococcus aeruginosus* and *Phormidium valderianum* tolerated hydrogen peroxide by showing the highest growth of Superoxide dismutase in *Synechococcus aeruginosus* and *Phormidium valderianum*, catalase in *Synechococcus aeruginosus*, peroxidase in *Synechococcus aeruginosus* and *Phormidium valderianum*, Glutathione S-transferase in *Synechococcus aeruginosus* and *Phormidium valderianum* which were identified as biochemical markers of oxidative stress against H_2O_2 in marine cyanobacteria. *Synechococcus aeruginosus* showed new isoforms for Superoxide dismutase, catalase, peroxidase, Glutathione peroxidase, and Glutathione S-transferase and *Phormidium valderianum* for Superoxide dismutase, peroxidase, and Glutathione S-transferase. *Synechococcus aeruginosus* is suggested as the indicator species for biochemical markers against hydrogen peroxide in marine cyanobacteria. Peroxidase is suggested as biochemical enzyme marker. The present investigated on these new isoenzymes were identified as biochemical markers for oxidative stress.

Keywords Hydrogen peroxide · *Synechococcus aeruginosus* · *Phormidium valdarianum* · Antioxidative enzymes · Biomarkers

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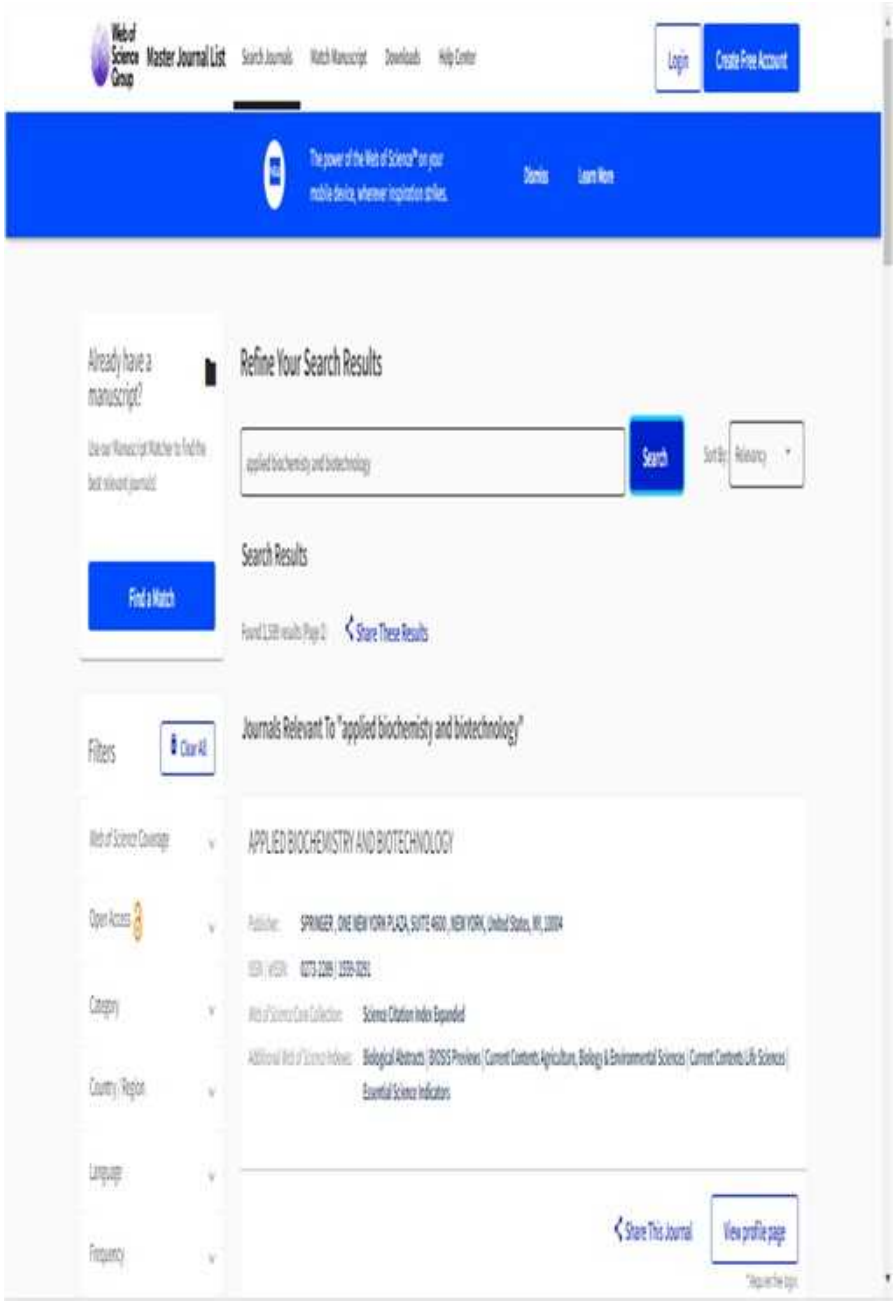

JETB

THE GENUS *OPHIOGLOSSUM* (OPHIOGLOSSACEAE) IN PUDUKKOTTAI DISTRICT, TAMIL NADU, INDIA

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Abstract

The survey of Snake tongue ferns in Pudukkottai district of Tamil Nadu, India, revealed the presence of five species of the genus *Ophioglossum*. A detailed description, illustrations, SEM image of spores, and key to the species of the genus in Pudukkottai district are provided.

Keywords: Pteridophytes; Adder's tongue ferns; Enumeration; spore SEM images; Key

Introduction

The genus *Ophioglossum* L. (Ophioglossaceae) is eusporangiate, monophyletic and cosmopolitan and represented by 50 accepted species (Hauk *et al.*, 2003; Hassler & Schmitt, 2020; POWO, 2022). Adder's/Snake tongue ferns are the species of *Ophioglossum* which were recognized greatly based on simple morphological features though at times confused due to complex morphological variations (Burrows & Johns, 2001). The variations within the genus are due to the large number of chromosomes owing to polyploidy, and consequently, several morphological variants were reported.

The species of *Ophioglossum* in India were first documented by Beddome (1883) and then followed Chakravarty (1951), Balakrishnan *et al.* (1960), Mahabale (1962), Panigrahi & Dixit (1969), Dixit (1984, 2000), Vasudeva & Bir (1993), Khullar (1994), Yadav & Tripathi (2002), Goswami (2007), Goswami *et al.* (2008), Singh *et al.* (2009), Patil & Dongare (2014), Kachhiyapatel *et al.* (2018), Patil & Rajput (2020), Mandal *et al.* (2020) and Jash & De (2020). Several new species of *Ophioglossum* were described from India in the last decade of which *O. chafoneri* H.K.Goswami *et al.*, *O. indicum* B.L.Yadav & H.K.Goswami, *O. raphaelianum* Anto *et al.*, *O. mahriae* M.Patel & M.N.Reddy, *O. aleatum* M.Patel *et al.* and *O. hiltishorei* M.Patel & M.N.Reddy were not accepted by POWO (2022). The novelties accepted are *O. gujaratense* S.M.Patil *et al.* and *O. jaykrishane* S.M.Patil *et al.* So, the total number of species of *Ophioglossum* in India varies from 12–20 (Jash & De, 2020) of which, only 14 species were accepted by Fraser-Jenkins *et al.* (2017).

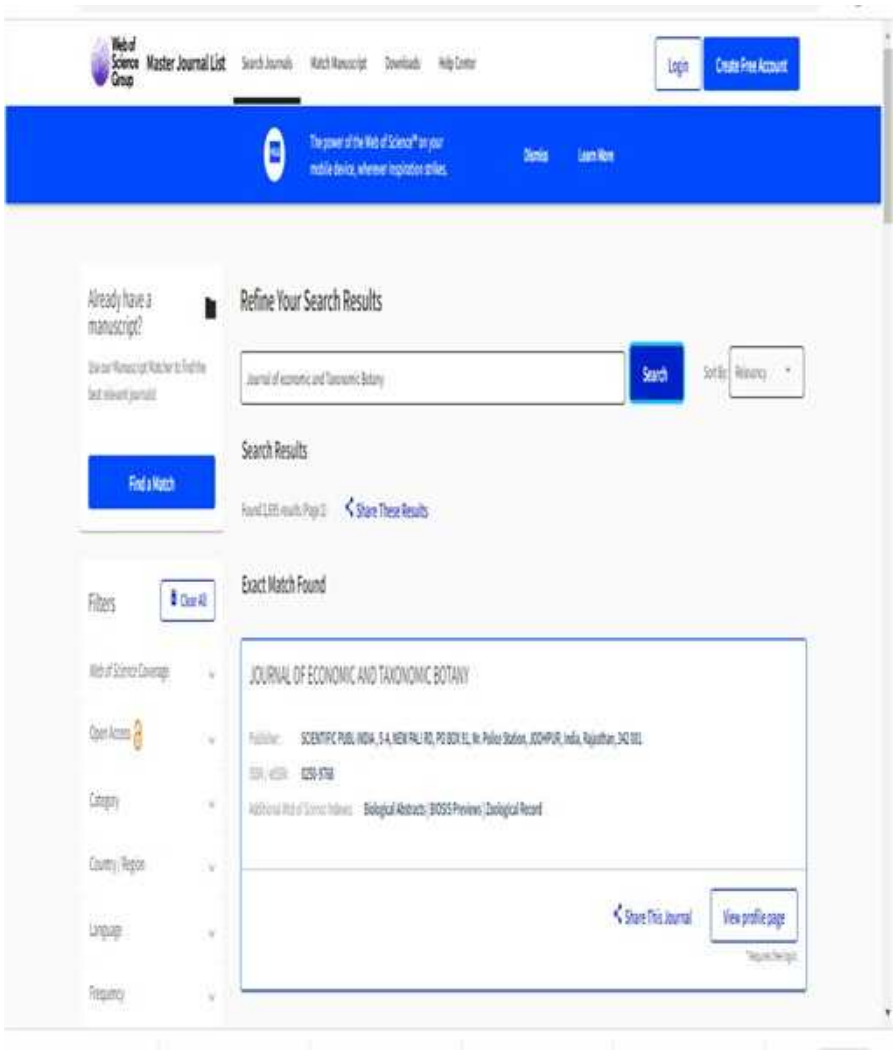
The pteridophytes of Tamil Nadu were studied by Matthew (1970), Sir & Vasudeva, (1971), Manickam, (1986), Manickam & Irudayaraj, (1992), Anandhan & Kumaravalli (2011), Raja (2017), Kavitha *et al.* (2017), Alagesaboopathi *et al.* (2018) and Sureshkumar *et al.* (2020). However, there is no comprehensive work on the genus *Ophioglossum*. Hence, the present study was undertaken to study the morphology, taxonomy, distribution, and spore morphology of the genus in the Pudukkottai district.

Study area

The Pudukkottai district was once a princely states (Raju, 1985). It is situated (9°50′ and 10°40′ N; 78°25′ and 79°15′ E) covering an area of 4663.29 sq km in the eastern part of Tamil Nadu in Peninsular India (Fig. 1). The district has a coastline of 42 km, bordered on the south by Sivagangai and Ramanathapuram districts, east by Bay of Bengal, north and west by Tiruchirappalli district and in the north by Thanjavur district (Raja, 2017).

Field Survey and Documentation

The field surveys were conducted throughout the Pudukkottai district during 2020–2021 to collect *Ophioglossum* specimens. During post-monsoon seasons,



Pharmacological and Phytochemical Investigation of Chloroxylon swietenia DC.

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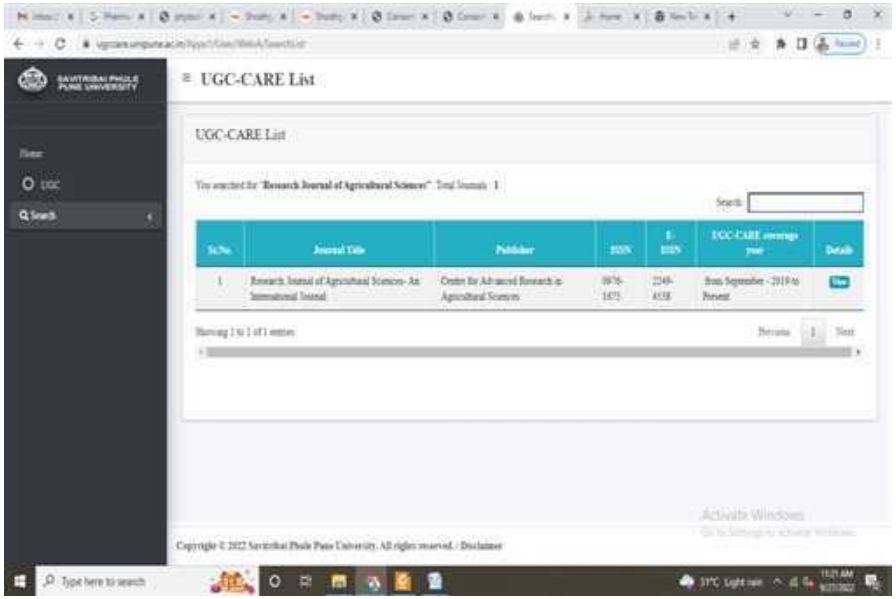

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(V)
Jasminum greenii sp. nov. (Oleaceae): A new species from Tamil Nadu, India

***Jasminum greenii* Soosairaj & P.Raja, sp. nov.**

Type. Vamban, 10°21'14.4"N, 78°55'51.2"E, 12-15 m, Pudukkottai district, Tamil Nadu, India, 27 Aug 2016, *S. Soosairaj and P. Raja* 4733 (holotype: RHT, isotypes: MH).

Climber; branchlets pubescent when young, later glabrescent. Leaves simple, opposite, decussate, broadly elliptic, 3-9.5 × 1.5-4.7 cm, sub-coriaceous, obtuse at both ends, occasionally acute at apex, slightly retuse, apiculate, glabrous above, tufts of hairs in axils of main nerves and midrib below; lateral nerves 4-6 pairs; petiole 2-6 mm long, pubescent when young, glabrous at maturity. Cymes compound; peduncle 2 mm in flower, 5-6 mm in fruit; bracts leafy, lanceolate, 1-2.2 × 0.5-1.3 cm, pubescent at adaxial, puberulent at abaxial; bracteoles 6-9 × 0.9-3 mm, linear-lanceolate, spathulate, pubescent. Flowers shortly pedicellate or subsessile.

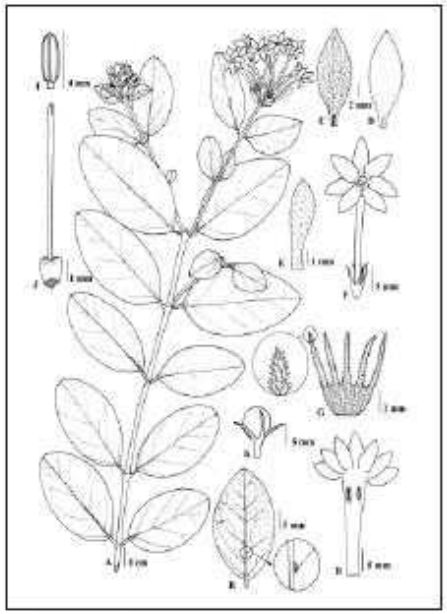
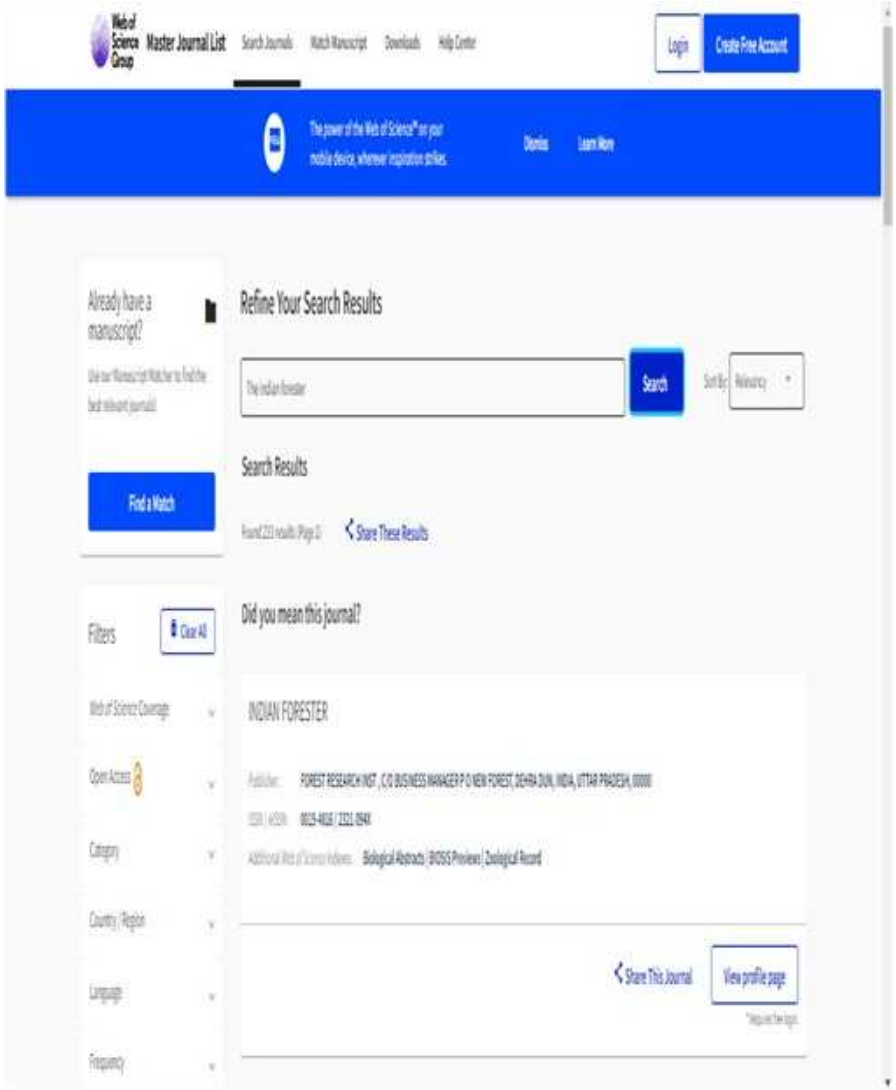
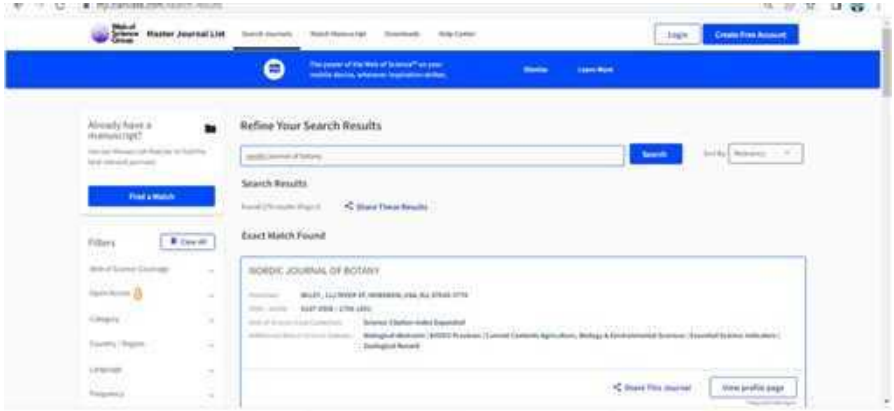


Fig. 1: *Jasminum greenii* Soosairaj & P.Raja: A, a twig; B, a leaf; C and D, adaxial and abaxial views of bract; E, a bracteole; F, a flower; G, split position of calyx; H, split position of corolla with stamens; I, a stamen; J, a pistil; K, a fruit





NORDIC JOURNAL OF
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Research article

Theriophonum blumei (Araceae), a new species from Tamil Nadu, India

Lourdusamy John Peter Arulanandam, Sebastian Soosairaj, Prakasam Raja and Balakrishnan Balaguru

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Theriophonum blumei sp. nov., a new species is described and illustrated from Tamil Nadu, India based on morphological and leaf epidermal features. Although morphologically *T. blumei* appears to be similar to *T. sivaganganum* (Ramam. & Sebastine) Bogner having long acuminate spathe, it is different from *T. sivaganganum* in various aspects such as ellipsoid seed with ridged surface, spinulose and bifid stigma, filiform neuters and berries with purplish strands. *T. blumei* has echinate pollen sculpture and *T. sivaganganum* has verrucate sculpture. Added to that, molecular based (*rbcL, matK, trnL-F*) phylogenetic analysis also indicate that *T. blumei* is genetically distinct from *T. sivaganganum*.

Keywords: matK, new species, rbcL, SEM, Tamil Nadu, *Theriophonum*, trnL-F

Introduction

The genus *Theriophonum* was first described by Blume in 1837. It is a cormous aroid genus of five to seven species that is endemic to the south and central parts of India with only *T. minutum* (Willd.) Baill. extending to Sri Lanka (Sivadasan and Nicolson 1982). *Theriophonum* shows variation in lamina shape, size and structure due to various ecological parameters such as soil type, shade and climatic condition (Sivadasan et al. 2014). Schott (1860) and Engler (1920) both recognized three species of *Theriophonum* from India. Thereafter, Bogner (1969) added *T. sivaganganum* (Ramam. & Sebastine) Bogner followed by Sivadasan and Nicolson (1982) who added *T. fischeri* Sivad. to the list. Later, two more new species viz. *T. manickamii* Murugan and Natarajan (2008) and *T. dantelii* Rajakumar et al. (2010) were published. However, Sivadasan et al. (2014) reduced the latter two species to synonyms of *T. fischeri* and *T. infausum* respectively. At present, the Plant List database (<www.theplantlist.org/>) accepts these two taxa as distinct species whereas the Plants of the World online (<www.plantsoftheworldonline.org/>) treats them as synonyms as proposed by Sivadasan et al. (2014).

During a field collection in Tiruchirappalli district of Tamil Nadu, we collected a specimen of *Theriophonum* from scrub forests. The identity of the specimen was examined at Rapinat Herbarium, Tiruchirappalli (RHT) and Madras Herbarium

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