

OPEN ACCESS

The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.



Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

SHORT COMMUNICATION

THE EXTINCTION OF FAURE'S BROOM *ADENOCARPUS FAUREI* MAIRE (LEGUMINOSAE) IN ALGERIA

Mohamed Djamel Miara, Mohammed Ait Hammou & Jah Skipper

26 April 2018 | Vol. 10 | No. 5 | Pages: 11595-11598
10.11609/jott.3887.10.5.11595-11598



For Focus, Scope, Aims, Policies and Guidelines visit <http://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-0>
For Article Submission Guidelines visit <http://threatenedtaxa.org/index.php/JoTT/about/submissions#onlineSubmissions>
For Policies against Scientific Misconduct visit <http://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-2>
For reprints contact info@threatenedtaxa.org

Partners



صندوق محمد بن زايد
للمحافظة على
الكائنات الحية
The Mohamed bin Zayed
SPECIES CONSERVATION FUND



zooh!
ZÜRICH

Member



Publisher & Host



Threatened Taxa



THE EXTINCTION OF FAURE'S BROOM *ADENOCARPUS FAUREI* MAIRE (LEGUMINOSAE) IN ALGERIA

Mohamed Djamel Miara¹, Mohammed Ait Hammou² & Jah Skipper³

^{1,2} Department of Natural and Life Sciences; Laboratory of Agro-Biotechnology and Nutrition research in Semi-Arid Areas, University Ibn Khaldoun, Tiaret, 14000, DZ, Algeria

³ Centre for Plant Diversity & Systematics, School of Plant Sciences, The University of Reading, Whiteknights, Reading RG6 6AS, UK

¹ miara14130@yahoo.fr (corresponding author), ² m_ait_hammou@hotmail.com, ³ jahskipper@gmail.com

OPEN ACCESS



Abstract: This study presents efforts made to re-discover the narrow Algerian endemic *Adenocarpus faurei* Maire and the possible implications of this on the conservation of the Tiaret area in northern Algeria. Field investigations within an expanded perimeter around known historical localities were carried out over a period of five years. This prospecting effort yielded no positive sightings highlighting the very probable extinction of *Adenocarpus faurei*, and the lack of novel field data for many plants of high conservation priority in Algeria.

Keywords: *Adenocarpus faurei*, endemic, extinction, Faure's Broom, rare, threatened, Tiaret.

Ranking amongst the eight richest global biodiversity hotspots (Myers et al. 2000), the Mediterranean basin has long been recognised for its high diversity and endemism levels (Quézel & Médail 2003). It is estimated that around 10% of the global vascular plant diversity can be found in this basin, despite only representing 1.6% of the global surface area (Médail & Quézel 1997; Véla & Benhouhou 2007). Being part of the Baetic-Riffian hotspot and home to around 3150 vascular plant species (Greuter 1991), of which 430 taxa are strictly endemic, 80 are rare, 31 are endangered and 22 vulnerable (Dobignard & Chatelain 2010–13), Algeria plays an important role in the conservation of Mediterranean

floral diversity. Anthropogenic activities, however, have led to considerable recent ecological change (Ellis & Haff 2009). Thus, this plant diversity is at great risk as the Mediterranean figures amongst the most globally threatened biomes, lacks sufficient protected areas and is rapidly losing habitats (Olson & Dinerstein 2002; Hoekstra et al. 2005).

Developing countries such as Algeria, despite harbouring high levels of diversity and endemism, often lack the required financial and technical resources to tackle the current biodiversity crisis (Pleguezuelos et al. 2004; Lee & Jetz 2008). Therefore, accounting for the incomplete literature on the extinction risk affecting the flora of Algeria, and in the context of limited resources, prioritising the study and conservation of narrow plant endemics is a logical choice as they are habitually the most threatened and can often be used to highlight the issues affecting the wider flora and their habitats (Caro 2010; Yahi & Benhouhou 2010). Considering the criteria set for endemism and rarity (Yahi et al. 2012), *Adenocarpus faurei* meets the requirements of a trigger species, only known to historically occupy a territory under 10km². The aim of this study was to look for

DOI: <http://doi.org/10.11609/jott.3887.10.5.11595-11598>

Editor: Francis Brearley, Manchester Metropolitan University, UK.

Date of publication: 26 April 2018 (online & print)

Manuscript details: Ms # 3887 | Received 11 November 2017 | Final received 09 March 2018 | Finally accepted 27 March 2018

Citation: Miara, M.D., M.A. Hammou & J. Skipper (2018). The extinction of Faure's Broom *Adenocarpus faurei* Maire (Leguminosae) in Algeria. *Journal of Threatened Taxa* 10(5): 11595–11598; <http://doi.org/10.11609/jott.3887.10.5.11595-11598>

Copyright: © Miara et al. 2018. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use of this article in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

Funding: There is no funding agencies or organization for this work.

Competing interests: The authors declare no competing interests.

Acknowledgments: The authors would like to thank Dr. Irene Teixidor (University of Reading, UK) for editing the English usage in the manuscript. We would like to express our gratitude to the anonymous reviewers who contributed to improve this manuscript.



Adenocarpus faurei within the historically reported locality (Maire 1921; Quézel & Santa 1962–63) and investigate its possible current presence.

***Adenocarpus faurei* Maire**

Adenocarpus faurei was described for the first time by Dr. René Maire (Fig. 1), from the valleys of Oued Sidi Khaled, southwest of the city of Tiaret in Algeria (35.3666°N & 1.3000°E) in woodland and scrub on siliceous mountains, at an altitude of around 1,100m. It is a 0.4–1.3 m tall shrub with small ciliate leaves on the margins, short petioles and yellow flowers. This highly localized plant was later validated and included in the work of Quézel & Santa (1962–63) despite having themselves failed in finding the type locality. Consequently, they relied on the herbarium specimens collected by the great French herbalist Alphonse Faure (1865–1958).

Research context and objectives

Adenocarpus faurei benefits from legal protection in Algeria (Decree 93-285 of November 21, 1993) and appears in reference literature. It is mentioned in the Flora of Algeria (Quézel & Santa 1962–63) as very rare strict endemic species and has been included in the IUCN Red List of Threatened Species as Endangered (Walter et al. 1998). *Adenocarpus faurei*, however, has not been seen or reported since 1926, when it was first described. The few studies carried out in the Tiaret region after 1962 (e.g., Dahmani 1997) do not report any sighting. Our previous floristic research conducted on the flora and vegetation of the Tiaret region, which started in 2009 (Miara 2011, 2017; Miara et al. 2012), did not record the taxon in any of our sampled plots either. The lack of apparent information validating the existence of the only known historical population and the current conservation challenges that the Tiaret region is facing reinforced the relevance of this study. Since the independence of Algeria in 1962, the valley of Oued Sidi Khaled that was wooded in many areas, has since been heavily urbanised. The lack of coherence and regulations in many parts of Algeria regarding building new property has led to the destruction of many natural and forested areas (Louni 1994). Added to this, the potential extinction of this narrow endemic would represent an irreplaceable loss for our biological heritage, and thus further justified field prospecting in view of proposing measures to save it from the verge of extinction if not too late. Thus, the aim of this study was to find this plant in the wild, despite the unfavourable circumstances.



Figure 1. Illustration of the specimen of *Adenocarpus faurei* (in Maire 1921) from Tiaret, Algeria.

Study area

Adenocarpus faurei was originally reported in the northern part of Tiaret region (Fig. 2). This region is part of the Tiareti-Tlemcenien Atlasic District (O3) that contains 94 endemic species, of which 41 are strict Algerian, 46 Algerio-Moroccan and seven Algerio-Tunisian endemics (Meddour 2010). This mountainous region is largely covered by forest and pre-forest groups of Green Oak (*Quercus ilex* L.) and Aleppo Pine (*Pinus halepensis* Mill. S.I.), and includes several local endemic plants (Miara 2016). Some of these endemics have a very restricted distribution, such as *Otocarpus virgatus* Durieu (Miara et al. 2014). These plants' populations remain relatively unknown since their description by French botanists during colonial times. Among them, *Adenocarpus faurei* is described and reported only in the Sidi Khaled Valley at Tiaret. This very localized area (less than 10km²) on the heights of the city of Tiaret is now surrounded by buildings and other urban infrastructure.

Research methodology

The study site was defined over an area of 20km² around the approximate point where the plant was described comprised of 1km² grid units to cover all the forest area of the mounts of Tiaret (Massif of Guezoul). In each of the grid units, a systematic sampling method

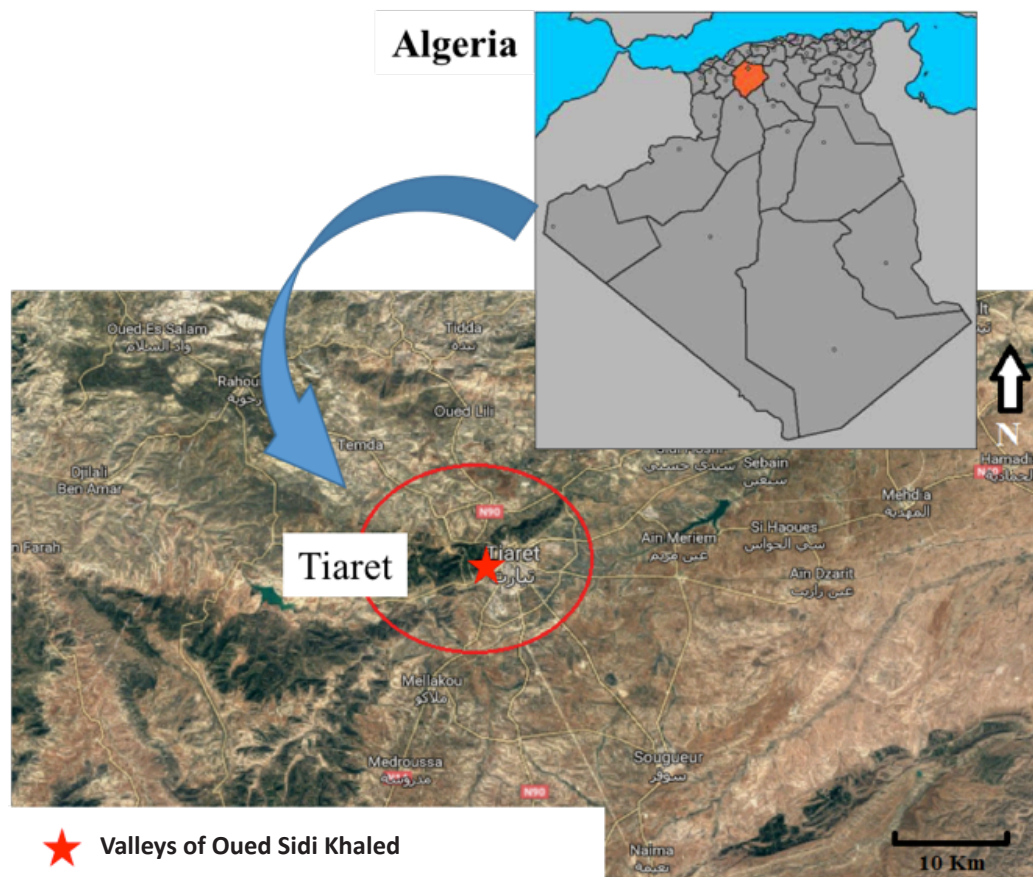


Figure 2. Location of the search area for *Adenocarpus faurei* around Tiaret, Algeria (search perimeter surrounded by red circle).

according to Gounot (1969) was followed; this method allows to completely scan the perimeter of investigation in order to find the target species. Urban regions were not explored, except for those closest to the description site. The research was executed by regular field trips throughout the year, intensified during the flowering period of the plant (June–July) during five successive years (2012–2017).

RESULTS AND DISCUSSION

This survey was not successful in finding *Adenocarpus faurei*. Since the region remains highly influenced by human activities, with the extension of habitations, intensive grazing and pollution being of major concern the observed threats reinforces the hypothesis of possible extinction for this plant. This research therefore highlighted the high probable extinction of *Adenocarpus faurei*. According to IUCN (2012), a taxon is presumed extinct when comprehensive studies in known and/or presumed habitat are conducted at appropriate times and throughout its historical range and did not record the presence of a single individual. Our study conforms to all these conditions, qualifying this taxon as presumed

extinct.

According to IUCN data (Walter et al. 1998), Algeria has no extinct taxa but rather 141 threatened taxa (31 endangered, 22 vulnerable, 80 rare and 8 indeterminate). This does not necessarily mean that plants are better protected in Algeria compared to other neighbouring or Mediterranean countries, rather, it seems that the lack of floristic research since independence in 1962 has limited our ability to accurately determine the conservation status of our flora. In Morocco, one species is reported extinct (*Trifolium acutiflorum* Murb.) and in Egypt, two taxa are considered extinct (*Fagonia taeckholmiana* Hadidi and *Tephrosia kassasi* Boulos). The countries of Mediterranean Europe have more data on extinct taxa (Turkey: 10 taxa, France: 7 taxa, Greece: 6 taxa, Italy: 2 taxa, Spain: 2 taxa).

The extinction of *Adenocarpus faurei* and its consequences

The extinction of *Adenocarpus faurei* represents a great loss for biodiversity and especially that of Algeria. This plant, which has great biological and patrimonial value for the country, could have benefited from in

situ and ex situ conservation programs. The defining characteristics of narrow endemics combined with the challenges they face in the Mediterranean region renders them particularly vulnerable. Research on these endemic, rare and localized plants is deficient and their conservation status, or even their existence, is not well known. In Algeria and the neighbouring countries of northern Africa, several similar species may be extinct in areas that are poorly protected or even neglected by responsible authorities.

CONCLUSION

The most likely extinction factor for *Adenocarpus faurei* Maire is the human activities primarily related to urbanisation such as increased building and cultivated surfaces. These results present a reminder for the need for novel and up-to-date field data when generating conservation assessments of the rare and endemic plants of Algeria and elsewhere. The protection of their natural habitats remains a priority. These natural habitats, however, are still poorly known and studies to determine IPAs (Important Plant Areas) in Algeria are to be carried out.

REFERENCES

- Caro, T.M. (2010). *Conservation by Proxy: Indicator, Umbrella, Keystone, Flagship, and Other Surrogate Species*. Island Press, 374p.
- Dahmani, M. (1997). Le chêne vert en Algérie, syntaxonomie, phytocologie et dynamique des peuplements. PhD Thesis. University of Science and Technology, Algiers, 383p.
- Dobignard, A. & C. Chatelain (2010-2011-2012-2013). Index Synonymique de la Flore d'Afrique du Nord - Vol 5. Conservatoire et Jardin Botaniques de la Ville de Genève.
- Ellis, E.C. & P.K. Haff (2009). Earth science in the Anthropocene: new epoch, new paradigm, new responsibilities. *EOS Transactions* 90: 473.
- Gounot, M. (1969). *Méthodes d'étude quantitative de la végétation*. Masson, Paris, 308pp.
- Greuter, W. (1991). Botanical diversity, endemism, rarity, and extinction in the Mediterranean area: an analysis based on the published volumes of med-checklist. *Botanical Chronicles* 10: 63–79.
- Hoekstra, J.M., T.M. Boucher, T.H. Ricketts & C. Roberts (2005). Confronting a biome crisis: global disparities of habitat loss and protection. *Ecology Letters* 8: 23–29.
- IUCN (2012). Catégories et Critères de la Liste rouge de l'IUCN : Version 3.1. Deuxième édition. Gland, Suisse et Cambridge, Royaume-Uni : IUCN. Originellement publié en tant que IUCN Red List Categories and Criteria: Version 3.1. Second edition. (Gland, Switzerland and Cambridge, UK: IUCN, 2012), vi+32pp.
- Lee, T.M. & W. Jetz (2008). Future battlegrounds for conservation under global change. *Proceedings of the Royal Society B: Biological Sciences* 275: 1261–1270.
- Louni, D. (1994). Les Forêts algériennes. *Forêts méditerranéennes*. T. X V N° 7: 59–63.
- Maire, R. (1921). Les *Adenocarpus* de l'Afrique du Nord. Extrait du bulletin de la station de recherches forestières du Nord de l'Afrique, Alger, T (1), 6ème fascicule; http://bibdigital.rjb.csic.es/Imagenes/MAI_Adenocarp_Afric_Nord/MAI_Adenocarp_Afric_Nord_009.pdf
- Médail, F. & P. Quézel (1997). Hot-spots analysis for conservation of plant biodiversity in the Mediterranean Basin. *Annals of the Missouri Botanical Garden* 84: 112–127.
- Meddour, R. (2010). Bioclimatologie, Phytogéographie et Phytosociologie en Algérie. Exemple des Groupements Forestiers et Pré Forestiers de la Kabylie Djurdjurienne. PhD Thesis. University of Tizi Ouzou, Algeria, 397pp.
- Miara, M.D. (2011). Contribution à l'étude de la végétation du massif de Guezoul (Tiaret). Magistère Thesis. University of Oran- Sénia, Algeria, 126pp.
- Miara, M.D. (2016). Etat des connaissances et mesures de conservation de la flore endémiques dans l'Atlas Tellien Occidental d'Algérie (Exemple de la région de Tiaret comme une nouvelle zone importante pour les plantes (IPA)). 1st Mediterranean Plant Conservation Week, 24–29 October 2016, Ulcinj, Montenegro. http://www.medplantsweek.uicnmed.org/public_html/medplantsweek/wp-content/uploads/2015/05/MPCW_Booklet.pdf
- Miara, M.D. (2017). Analyse floristique et structure de la végétation naturelle de la région de Tiaret. PhD Thesis. University of Oran, Algeria, 148pp.
- Miara, M.D., S.H. Aoul & M.A. Hammou (2012). Analyse phytocologique et syntaxonomique des groupements végétaux dans le Massif de Guezoul - Tiaret (N-O Algérie). *Bulletin de la Société Botanique du Centre-Ouest (SBCO)*, Paris, Nouvelle Série 43: 279–316.
- Miara, M.D., M.A. Hammou & S.H. Aoul (2014). Redécouverte d'*Otocarpus virgatus* Durieu (Brassicaceae) dans la région de Tiaret (N-O Algérie). *Bulletin de la Société Linnéenne de Provence*, France 65: 31–35.
- Myers, N., R.A. Mittermeier, C.G. Mittermeier, G.A.B. Da Fonseca & J. Kent (2000). Biodiversity hotspots for conservation priorities. *Nature* 403: 853–858.
- Olson, D.M. & E. Dinerstein (2002). The Global 200: priority ecoregions for global conservation. *Annals of the Missouri Botanical Garden* 89: 199–224.
- Pleguezuelos, J.M., R. Márquez & M. Lizana (eds.) (2004). *Atlas y Libro Rojo de los Anfibios y Reptiles de España*. Dirección General de Conservación de la Naturaleza-Asociación Herpetológica Española, Madrid, Spain.
- Quézel, P. & S. Santa (1962-63). *Nouvelle flore de l'Algérie et des régions désertiques méridionales*. CNRS, Paris, 2 vols, 1170p.
- Véla, E. & S. Benhouhou (2007). Evaluation d'un nouveau point chaud de biodiversité végétale dans le bassin méditerranéen (Afrique du nord). *Comptes Rendus Biologies* 330: 589–605.
- Walter, K.S. & H.J. Gillett (eds.) (1998). *1997 IUCN Red List of Threatened Plants. Compiled by the World Conservation Monitoring Centre*. IUCN - The World Conservation Union, Gland, Switzerland and Cambridge, UK, 336pp.
- Yahi, N. & S. Benhouhou (2010). Algeria, pp. 27–30. In: Radford, E.A., G. Catullo & B. de Montmollin (eds.). *Important Plant Areas of the South and East Mediterranean Region: Priority Sites for Conservation*.
- Yahi, N., E. Véla, S. Benhouhou, G. De Belair & R. Gharzouli (2012). Identifying Important Plants Areas (Key Biodiversity Areas for Plants) in northern Algeria. *Journal of Threatened Taxa* 4: 2753–2765; <http://doi.org/10.11609/JoTT.o2998.2753-65>





OPEN ACCESS



The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

April 2018 | Vol. 10 | No. 5 | Pages: 11551–11702

Date of Publication: 26 April 2018 (Online & Print)

DOI: 10.11609/jott.2018.10.5.11551-11702

www.threatenedtaxa.org

Article

Butterfly diversity in human-modified ecosystems of southern Sikkim, the eastern Himalaya, India

-- Prem Kumar Chettri, Kishor Sharma, Sailendra Dewan & Bhoj Kumar Acharya, 11551–11565

Communications

Contrasting human perceptions of and attitudes towards two threatened small carnivores, *Lycalopex fulvipes* and *Leopardus guigna*, in rural communities adjacent to protected areas in Chile

-- I. Sacristán, A. Cevidanes, F. Acuña, E. Aguilar, S. García, M.J. López, J. Millán & C. Napolitano, Pp. 11566–11573

Sighting trend of the Indian Skimmer (Charadriiformes: Laridae: *Rynchops albicollis* Swainson, 1838) in National Chambal Gharial Sanctuary (1984–2016) reflecting on the feasibility of long-term ecological monitoring

-- L.A.K. Singh & R.K. Sharma, Pp. 11574–11582

Comparative cross-sectional survey on gastrointestinal parasites of captive, semi-captive, and wild Elephants of Sri Lanka

-- Nirupama Abeyssekara, R.P.V. Jayanthe Rajapakse & R.S. Rajakaruna, Pp. 11583–11594

Short Communications

The extinction of Faure's Broom *Adenocarpus faurei* Maire (Leguminosae) in Algeria

-- Mohamed Djamel Miara, Mohammed Ait Hammou & Jah Skipper, Pp. 11595–11598

Conservation assessment of two rare gingers (Zingiberaceae) from Dampa Tiger Reserve, Mizoram, India

-- Pankaj Kumar & Priya Singh, Pp. 11599–11605

New records of bats (Mammalia: Chiroptera) from Assam, northeastern India with a distribution list of bat fauna of the state

-- Ananda Ram Boro, Prasanta Kumar Saikia & Uttam Saikia, Pp. 11606–11612

On the birds of Marivan County, western Iran: an update

-- Fatah Zarei, Seyed Naseh Hosseini, Jalal Pezeshk, Loghman Maleki & Hamid Reza Esmaeili, Pp. 11613–11617

Nesting pattern of birds in Jahangirnagar University Campus, Bangladesh

-- Israt Jahan, Sajeda Begum, Mohammad Mostafa Feeroz, Delip Kumar Das & Ashis Kumar Datta, Pp. 11618–11635

An annotated checklist of the birds of the upper Siang region, Arunachal Pradesh, India

-- Anirban Datta-Roy, Vivek Ramachandran & Karthik Teegalapalli, Pp. 11636–11651

Partners



صندوق محمد بن زايد
للمحافظة على
الكائنات الحية
The Mohamed bin Zayed
SPECIES CONSERVATION FUND



Report of the early winter migrants and resident birds in an inland wetland near Tundi Camp, Bajana, Gujarat

-- Abhishek Chatterjee, Sudeshna Ghoshal, Soumyajit Chowdhury & Pinakiranjan Chakrabarti, Pp. 11652–11658

The first report of two thread-legged assassin bugs (Hemiptera: Reduviidae: Emesinae) from India

-- Balasaheb V. Sarode, Swapnil S. Boyane & Hemant V. Ghate, Pp. 11659–11664

Water striders, the genus *Cylindrostethus* Mayr (Insecta: Heteroptera: Gerridae) from India with a new record

-- E. Eyarin Jehamalar, Kailash Chandra & G. Srinivasan, Pp. 11665–11671

The invasive aphid *Pterochloroides persicae* (Cholodkovsky, 1899) (Hemiptera: Aphidoidea: Lachninae) recorded on important fruit trees in Kashmir Valley, India

-- Govindasamy Mahendiran, Shahid Ali Akbar & Mudasir Ahmad Dar, Pp. 11672–11678

Notes

Anemone trullifolia and *Berberis angulosa* as new records to the flora of the western Himalaya, India

-- Ishwari Datt Rai, Gajendra Singh & Gopal Singh Rawat, Pp. 11679–11682

Notes on fairy orchids (Magnoliopsida: Asparagales: Orchidaceae: *Oberonia*) of Sri Lanka: revision in regional distribution and documentation on vegetative propagation

-- Menaka Ariyaratne & Deepthi Yakandawala, Pp. 11683–11685

Additional reports of solitary potter wasps (Hymenoptera: Vespidae: Eumeninae) in Bhutan

-- Tshering Nidup, Wim Klein, P. Girish Kumar & Phurpa Dorji, Pp. 11686–11696

On the occurrence of the rare Long-nosed Stargazer *Ichthyoscopus lebeck* (Bloch & Schneider, 1801) (Uranoscopidae) in the coastal waters off Visakhapatnam, India

-- Govinda Rao Velamala & Muddula Krishna Naranji, Pp. 11697–11700

Correction

Corrigendum - Butterfly host plant Monograph, P. 11701

Miscellaneous

National Biodiversity Authority

Member



Publisher & Host

