Building evidence for conservation globally

Journal of Threatened Taxa

10.11609/jott.2023.15.9.23827–23930
www.threatenedtaxa.org

26 September 2023 (Online & Print)
15(9): 23827–23930
ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

Open Access



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

Publisher
Wildlife Information Liaison Development Society
www.wild.zooreach.org

Host
Zoo Outreach Organization
www.zooreach.org

43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore, Tamil Nadu 641006, India
Registered Office: 3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore, Tamil Nadu 641006, India
Ph: +91 9385339863 | www.threatenedtaxa.org
Email: sanjay@threatenedtaxa.org

EDITORS

Founder & Chief Editor
Dr. Sanjay Molur
Wildlife Information Liaison Development (WILD) Society & Zoo Outreach Organization (ZOO), 43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore, Tamil Nadu 641006, India

Deputy Chief Editor
Dr. Neelesh Dahanukar
Noida, Uttar Pradesh, India

Managing Editor
Mr. B. Ravichandran, WILD/ZOO, Coimbatore, Tamil Nadu 641006, India

Associate Editors
Dr. Mandar Paingankar, Government Science College Gadchiroli, Maharashtra 442605, India
Dr. Ulrike Streicher, Wildlife Veterinarian, Eugene, Oregon, USA
Ms. Priyanka Iyer, ZOO/WILD, Coimbatore, Tamil Nadu 641006, India
Dr. B.A. Daniel, ZOO/WILD, Coimbatore, Tamil Nadu 641006, India

Editorial Board
Dr. Russel Mittermeier
Executive Vice Chair, Conservation International, Arlington, Virginia 22202, USA

Prof. Mewa Singh Ph.D., FASc, FNA, FNASc, FNAPsy
Ramanna Fellow and Life-Long Distinguished Professor, Biopsychology Laboratory, and Institute of Excellence, University of Mysore, Mysuru, Karnataka 570006, India; Honorary Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore; and Adjunct Professor, National Institute of Advanced Studies, Bangalore

Stephen D. Nash
Scientific Illustrator, Conservation International, Dept. of Anatomical Sciences, Health Sciences Center, T-8, Room 045, Stony Brook University, Stony Brook, NY 11794-8081, USA

Dr. Fred Pluthero
Toronto, Canada

Dr. Priya Davidar
Sigur Nature Trust, Chadapatti, Mavinhalla PO, Nilgiris, Tamil Nadu 643223, India

Dr. Martin Fisher
Senior Associate Professor, Battcock Centre for Experimental Astrophysics, Cavendish Laboratory, JJ Thomson Avenue, Cambridge CB3 0HE, UK

Dr. John Fellowes
Honorary Assistant Professor, The Kadoorie Institute, 8/F, T.T. Tsui Building, The University of Hong Kong, Pokfulam Road, Hong Kong

Prof. Dr. Mirco Solé
Universidade Estadual de Santa Cruz, Departamento de Ciências Biológicas, Vice-coordenador do Programa de Pós-Graduação em Zoologia, Rodovia Ilhéus/Itabuna, Km 16 (45662-000) Salobrinho, Ilhéus - Bahia - Brasil

Dr. Rajeev Raghavan
Professor of Taxonomy, Kerala University of Fisheries & Ocean Studies, Kochi, Kerala, India

English Editors
Mrs. Mira Bhojwani, Pune, India
Dr. Fred Pluthero, Toronto, Canada
Mr. P. Ilangovan, Chennai, India
Ms. Sindhura Stothra Bhashyam, Hyderabad, India

Web Development
Mrs. Latha G. Ravikumar, ZOO/WILD, Coimbatore, India

Typesetting
Mrs. Radhika, ZOO, Coimbatore, India
Mrs. Geetha, ZOO, Coimbatore India

Fundraising/Communications
Mrs. Payal B. Molur, Coimbatore, India

Subject Editors 2020–2022

Fungi

Dr. B. Shivaraju, Bengaluru, Karnataka, India
Dr. R.K. Verma, Tropical Forest Research Institute, Jabalpur, India
Dr. Vatsavaya S. Raju, Kakatiay University, Warangal, Andhra Pradesh, India
Dr. M. Krishnappa, Jnana Sahyadri, Kuvempu University, Shimoga, Karnataka, India
Dr. K.R. Sridhar, Mangalore University, Mangalagangotri, Mangalore, Karnataka, India
Dr. Gunjan Biswas, Vidyasagar University, Midnapore, West Bengal, India
Dr. Kiran Ramchandra Ranadive, Annasaheb Magar Mahavidyalaya, Maharashtra, India

Plants

Dr. G.P. Sinha, Botanical Survey of India, Allahabad, India
Dr. N.P. Balakrishnan, Ret. Joint Director, BSI, Coimbatore, India
Dr. Shonil Bhagwat, Open University and University of Oxford, UK
Prof. D.J. Bhat, Retd. Professor, Goa University, Goa, India
Dr. Ferdinando Boero, Università del Salento, Lecce, Italy
Dr. Dale R. Calder, Royal Ontaro Museum, Toronto, Ontario, Canada
Dr. Cleofas Cervancia, Univ. of Philippines Los Baños College Laguna, Philippines
Dr. F.B. Vincent Florens, University of Mauritius, Mauritius
Dr. Merlin Franco, Curtin University, Malaysia
Dr. V. Irudayaraj, St. Xavier's College, Palayamkottai, Tamil Nadu, India
Dr. B.S. Kholia, Botanical Survey of India, Gangtok, Sikkim, India
Dr. Pankaj Kumar, Department of Plant and Soil Science, Texas Tech University, Lubbock, Texas, USA.
Dr. V. Sampath Kumar, Botanical Survey of India, Howrah, West Bengal, India
Dr. A.J. Solomon Raju, Andhra University, Visakhapatnam, India
Dr. Vijayasankar Raman, University of Mississippi, USA
Dr. B. Ravi Prasad Rao, Sri Krishnadevaraya University, Anantpur, India
Dr. K. Ravikumar, FRLHT, Bengaluru, Karnataka, India
Dr. Aparna Watve, Pune, Maharashtra, India
Dr. Qiang Liu, Xishuangbanna Tropical Botanical Garden, Yunnan, China
Dr. Noor Azhar Mohamed Shazili, Universiti Malaysia Terengganu, Kuala Terengganu, Malaysia
Dr. M.K. Vasudeva Rao, Shiv Ranjani Housing Society, Pune, Maharashtra, India
Prof. A.J. Solomon Raju, Andhra University, Visakhapatnam, India
Dr. Mandar Datar, Agharkar Research Institute, Pune, Maharashtra, India
Dr. M.K. Janarthanam, Goa University, Goa, India
Dr. K. Karthigeyan, Botanical Survey of India, India
Dr. Errol Vela, University of Montpellier, Montpellier, France
Dr. P. Lakshminarasimhan, Botanical Survey of India, Howrah, India
Dr. Larry R. Noblick, Montgomery Botanical Center, Miami, USA
Dr. K. Haridasan, Pallavur, Palakkad District, Kerala, India
Dr. Analinda Manila-Fajard, University of the Philippines Los Banos, Laguna, Philippines
Dr. P.A. Sinu, Central University of Kerala, Kasaragod, Kerala, India
Dr. Afroz Alam, Banasthali Vidyapith (accredited A grade by NAAC), Rajasthan, India
Dr. K.P. Rajesh, Zamorin's Guruvayurappan College, GA College PO, Kozhikode, Kerala, India
Dr. David E. Boufford, Harvard University Herbaria, Cambridge, MA 02138-2020, USA
Dr. Ritesh Kumar Choudhary, Agharkar Research Institute, Pune, Maharashtra, India
Dr. A.G. Pandurangan, Thiruvananthapuram, Kerala, India
Dr. Navendu Page, Wildlife Institute of India, Chandrabani, Dehradun, Uttarakhand, India
Dr. Kannan C.S. Warrier, Institute of Forest Genetics and Tree Breeding, Tamil Nadu, India

Invertebrates

Dr. R.K. Avasthi, Rohtak University, Haryana, India
Dr. D.B. Bastawade, Maharashtra, India
Dr. Partha Pratim Bhattacharjee, Tripura University, Suryamaninagar, India
Dr. Kailash Chandra, Zoological Survey of India, Jabalpur, Madhya Pradesh, India
Dr. Ansie Dippenaar-Schoeman, University of Pretoria, Queenswood, South Africa
Dr. Rory Dow, National Museum of natural History Naturalis, The Netherlands
Dr. Brian Fisher, California Academy of Sciences, USA
Dr. Richard Gallon, llandudno, North Wales, LL30 1UP
Dr. Hemant V. Ghate, Modern College, Pune, India
Dr. M. Monwar Hossain, Jahangirnagar University, Dhaka, Bangladesh

For Focus, Scope, Aims, and Policies, visit https://threatenedtaxa.org/index.php/JoTT/aims_scope
For Article Submission Guidelines, visit https://threatenedtaxa.org/index.php/JoTT/about/submissions
For Policies against Scientific Misconduct, visit https://threatenedtaxa.org/index.php/JoTT/policies_various

continued on the back inside cover

Cover: Stripe-necked Mongoose *Urva vitticolla* in poster colours, adapted from photograph by Ashni Dhawale, by Pooja Ramdas Patil.

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 September 2023 | 15(9): 23898–23910
ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)
https://doi.org/10.11609/jott.8585.15.9.23898-23910
#8585 | Received 12 June 2023 | Final received 24 July 2023 | Finally accepted 04 September 2023
COMMUNICATION
OPEN ACCESS

Diversity of powdery mildew fungi from protected areas of Jizzak region, Uzbekistan - a checklist

I.M. Mustafaev [1], I.Z. Ortiqov [2], K.K. Nuraliev [3] & D.S. Khujaqulova [4]

[1,2,4] Institute of Botany of Academy of Sciences of the Republic of Uzbekistan, Tashkent 100053, Uzbekistan.
[3] Tashkent State Agrarian University, Tashkent 100140, Uzbekistan.
[1] elyor-mustafaev@inbox.ru (corresponding author), [2] ortiqovi@inbox.ru, [3] h.nuraliev@mail.ru, [4] durdonaxojaqulova@gmail.com

Abstract: The first-ever compilation of a checklist for powdery mildew fungi within the protected areas of Uzbekistan's Jizzakh region, specifically Nuratau Nature Reserve, Zaamin National Nature Park, and Zaamin Nature Reserve is presented through this study. Field research spanning from 2009 to 2022 facilitated this comprehensive endeavor. A comprehensive identification process revealed a total of nine groups, consisting of 57 distinct types, 69 variations, and four different strains of powdery mildew. Two species, namely *Erysiphe platani* and *E. syringae*, were newly identified within the mycobiota of the country. Additionally, the plant index of Uzbekistan documented 11 powdery mildew species and ten variations on 18 previously unrecorded host plant species. Most species of powdery mildew fungi belong to the genera *Erysiphe* and *Leveillula*. The annotated checklist includes data on the host plant, location, date and collection number of every species.

Keywords: Disease, Erysiphaceae, host plants, Nuratau Nature Reserve, Zaamin Nature Reserve, Zaamin National Nature Park.

Uzbek: Ushbu maqolada O'zbekistonning Jizzax viloyatida joylashgan Nurota qo'riqxonasi, Zomin milliy bog'i va Zomin davlat qo'riqxonasi hududlarida tarqalgan un-shudring zamburug'larining dastlabki ro'yxati keltirilgan. Natijalar 2009 yildan 2022 yilgacha bo'lgan tadqiqot natijalari asosida shakllantirilgan. Dala tadqiqotlari davomida olib kelingan mikologik gerbariy namunalarini identifikatsiya qilish jarayonida un-shudring zamburug'larining 57 tur, 69 forma va 4 variatsiyasi qayd etildi. Shundan, *Erysiphe platani* va *E. syringae* O'zbekiston mikobiotasi uchun yangi ekanligi aniqlangan. Bundan tashqari, 11 tur un-shudring zamburug'lari xo'jayin o'simliklarning 18 turida ilk bor qayd etilgan. Tadqiqot hududlarida un-shudring zamburug'lari orasida *Erysiphe* va *Leveillula* turkumi vakillari yetakchilik qiladi. Ushbu maqolada xar bir zamburug' turning xo'jayin o'simligi, qayd etilgan yilllari keltirilgan.

Editor: Anonymity requested.

Date of publication: 26 September 2023 (online & print)

Citation: Mustafaev, I.M., I.Z. Ortiqov, K.K. Nuraliev & D.S. Khujaqulova (2023). Diversity of powdery mildew fungi from protected areas of Jizzak region, Uzbekistan - a checklist. *Journal of Threatened Taxa* 15(9): 23898–23910. https://doi.org/10.11609/jott.8585.15.9.23898-23910

Copyright: © Mustafaev et al. 2023. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use, reproduction, and distribution of this article in any medium by providing adequate credit to the author(s) and the source of publication.

Funding: Agency for Innovative development under the ministry of higher education, science and innovation of the Republic of Uzbekistan.

Competing interests: The authors declare no competing interests.

Author details: Ilyor Muraddullayevich Mustafayev, Institute of Botany of Academy of Sciences of the Republic of Uzbekistan. Head of the laboratory of Mycology and Algology. Specialization—fungal diversity, fungal taxonomy, fungal ecology, plant disease management. Islom Ziyodulla ugli Ortiqov, PhD student, Institute of Botany of Academy of Sciences of the Republic of Uzbekistan. Specialization—mycology, fungal diversity, plant disease management. Khamra Khaydaraliyevich Nuraliev, Tashkent State Agrarian University. Professor of the Department of Plant Protection. Specialization—mycology, plant disease management. Durdona Sadriddin qizi Khujaqulova, PhD student, Institute of Botany of Academy of Sciences of the Republic of Uzbekistan. Specialization—mycology.

Author contributions: I.M.M. - reviewing and editing; I.Z.O. - writing, reviewing and editing; K.K.N. - data collection; D.S.K. - reviewing and data collection. All authors have read and agreed to the published version of the manuscript.

Acknowledgements: This work was partly supported by the Ministry of Innovative Development of the Republic of Uzbekistan (the project "A-FA-2021-144") and state program "Pathogenic fungi of economically important plants exporting fruits, vegetables and melons: diversity, monitoring, and creation of an electronic database". Valuable suggestions of anonymous reviewers for improving the manuscript are appreciated.

INTRODUCTION

Powdery mildews belong to the *Erysiphaceae*. The main geographical regions of the distribution are in the temperate zone of the northern hemisphere. They are obligate biotrophs responsible for diseases in many plants. They are cosmopolitan, widespread on various hosts including vegetables, trees, herbs, shrubs, grasses, ornamental plants and weeds (Braun 1987). In many cases, powdery mildew fungi are more common in cultivated plant hosts (Pawar & Patil 2011). The fungi infect almost every group of plants, i.e., from grasses to higher angiosperms (Braun & Cook 2012). Powdery mildews are easily visible on infected plant leaves, stems, and fruits. The first symptoms appear as white powdery spots on leaves, branches and sometimes on fruits. Over time, disease severity increases under favorable conditions. Disease symptoms usually appear with the onset of summer and begin to disappear during the scorching heat and rainy season (Pap et al. 2013).

A considerable number of powdery mildew samples were collected and examined during exploring of the fungal diversity of Uzbekistan; contributions have been published in 1926–2023 (Zaprometov 1926; 1928; Golovin 1949; Rotkevich 1960; Gaponenko 1965; Gaponenko et al. 1983; Solieva 1989; Kamilov 1991; Nuraliev 1998; Gafforov 2004; Mustafaev 2018; Mustafaev et al. 2019; Abdurazakov et al. 2021).

Recently, invasive species of powdery mildew, originating from other regions of the world, have spread extensively in Uzbekistan (e.g., *Erysiphe australiana* on *Lagerstroema indica*); they are mostly found on introduced trees and shrubs that are widely used for landscaping (Nabieva et al. 2021).

The current study aims to compile a checklist of powdery mildew of vascular plants of the Nuratau Nature Reserve, Zaamin Nature Reserve, and Zaamin National Nature Park in the Jizzakh region. The present checklist serves as one of the sources to make the complete modern list of powdery mildew of the Rebuplic of Uzbekistan.

Study Area

The present compilation brings together as much information, related to powdery mildew reported from protected areas of Jizzakh region (Nuratau Nature Reserve 40°30’34.8’’ 66°44’18.4’’, Zaamin Nature, Reserve 39°34’41.4’’ 68°24’21.5’’, Zaamin National Nature Park 39°39’56.4’’ 68°24’18.3’’) (Fig. 1), as possible.

METHODS

About 1,000 powdery mildew fungi were collected in 2009–2022 years in different habitats of protected natural areas. Samples were collected from the affected parts of the plants and either used fresh or stored dry as herbarium material until analysis, as described by Heluta (1989). These are designated in the checklist by the following abbreviations: NNR –Nuratau Nature Reserve, ZNR – Zaamin Nature Reserve, ZNNP – Zaamin National Nature Park. Specimens: Chasmothecia, conidiophores, and conidia were observed and measured in oil immersion, using a Moticam 5N-300M microscope at a magnification up to ×400 and identified using the relevant literature (Zaprometov 1926; 1928; Golovin 1941; Gaponenko 1965; Panfilova & Gaponenko 1983; Gaponenko et al. 1983; Heluta et al. 2004; Braun 2012; Raximova et al. 2014). (1968–1993) and ‘Flora of Uzbekistan’ (1941–1962). All collected specimens are stored in the Fungarium of the Institute of Botany in Tashkent. Voucher specimens for each species of powdery mildew fungi are cited in the checklist below. The name of the collector is designated by abbreviation: IM – Ilyor Mustafaev, IOZ – Islom Ortiqov, XD – Xo`jaqulova Durdona. The taxonomy and nomenclature of powdery mildew fungi in the checklist follow international databases Index Fungorum (2023) and Mycobank (2023). The nomenclature of host plants is given according to powo.science.kew.org/results (2023). All collected specimens are stored in the Tashkent Mycological Herbarium (TASM) of the Institute of Botany.

RESULTS

In the protected areas of the Jizzakh region, including NNR, ZNR, and ZNNP, an extensive survey uncovered a diverse range of powdery mildew fungi. These findings encompass nine genera and 57 species, with 69 forms and four varieties, all identified through morphological characteristics. These fungi were documented on 137 host plant species, further grouped into 107 genera and 34 families (Table 1). *Erysiphe* emerged as the most species-rich genus, boasting 19 species, 26 forms, and four variations, closely followed by *Leveillula* with 16 species and 27 forms. *Podosphaera* accounted for nine species and three forms, while *Phyllactinia* exhibited four species and four forms. Additionally, *Golovinomyces* and *Sphaerotheca* each comprised four and three species, respectively, while *Uncinula*, *Neoerysiphe*, and *Blumeria* were each confined to one host plant species.

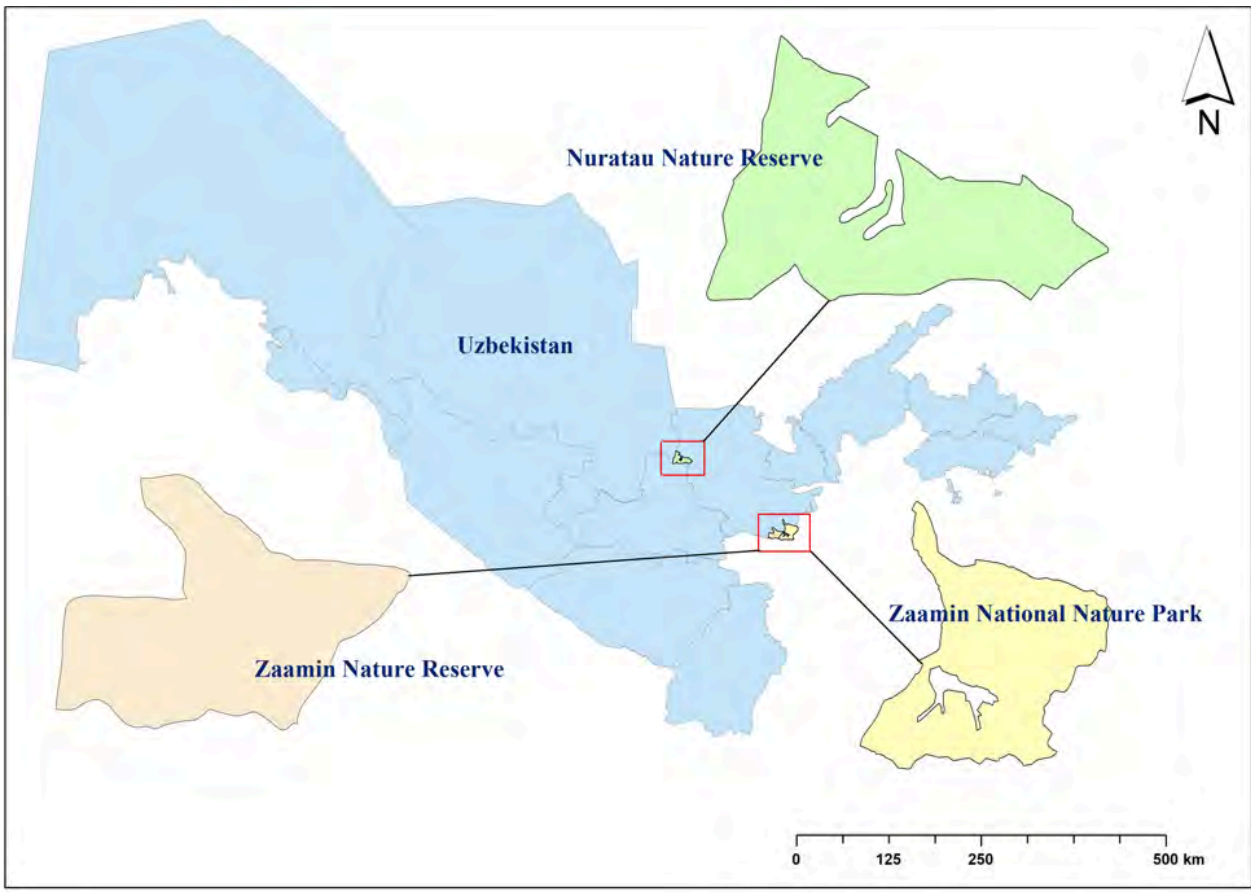


Figure 1. The map illustrates the location of the protected areas in the Jizzakh region.

Erysiphe species demonstrated the broadest host range, infecting 57 host plant species (41.6 % of the total), followed by *Leveillula* with 35 host plant species (25.4 %), and *Podosphaera* with 19 host plant species (13.8 %). *Sphaerotheca* was found on 11 host plant species (8.0 %), while the remaining genera—*Blumeria*, *Phyllactinia*, *Golovinomyces*, *Neoerysiphe*, and *Uncinula*—showed isolation to fewer host species. This comprehensive investigation highlights the wide distribution of powdery mildew fungi in the protected areas of the Jizzakh region, underscoring the need for further research to uncover their ecological roles and potential impacts.

Two species *Erysiphe platani* – on *Platanus orientalis* and *E. syringae* – on *Ligustrum* sp. were found for the first time for the mycobiota of Uzbekistan. Eleven species, 10 variaties of powdery mildew were recorded on 18 new host plant species index of Uzbekistan: *Blumeria graminis* – *Poa trivialis*, *Erysiphe cichoracearum* f. *lactucae* – *Lactuca orientalis*, *E. cichoracearum* f. *tanaceti- Lepidolopha komarowii*, *E. cruciferarum* – *Descurainia sophia*, *E. heraclei* – *Ferula penninervis*, *Ferula angreni* and *Physocaulis nodosus*, *Leveillula boraginacearum* f. *lappulae* – *Pseudoheterocaryum szovitsianum*, *L. compositarum* f. *artemisiae* – *Artemisia oliveriana*, *L. compositarum* f. *helichrysi* – *Helichrysum nuratavicum*, *L. labiatarum* f. *dracocephali* – *Dracocephalum nuratavicum*, *L. labiatarum* f. *scutellariae* – *Scutellaria ramosissima*, *L. labiatarum* f. *phlomidis* – *Phlomis nubilans*, *L. umbelliferarum* f. *heraclei* – *Semenovia pimpinelloides*, *Podosphaera fugax* – *Geranium rotundifolium*, *Sphaerotheca fuliginea* f. *lophanthi* – *Lophanthus schtschurowskianus*, *Sph. fuliginea* f. *sedi* – *Pseudosedum lievenii*, *Sphaerotheca* sp. – *Geum kokanicum*.

Among them, *Helichrysum nuratavicum*, *Phlomis nubilans* are endemic species for Nuratau ridge and *Phlomis nubilans*, *Helichrysum nuratavicum* and *Platanus orientalis* are listed in the Red Data Book of Uzbekistan (2019).

Thirty-two hosts of family Asteraceae were infected with powdery mildew followed by Rosaceae (19), Lamiaceae (14), Poaceae (13), Brassicaceae (12), Apiaceae (10), Fabaceae Boraginaceae (8 each), Dipsacaceae, Polygonaceae (5 each), Scrophulariaceae, Geraniaceae

Table 1. In this section, the scientific name of host plants along with the powdery mildew fungi occurring on them are provided.

Host plant (scientific name)	Powdery mildew fungi (scientific name)
Achillea sp.	*Leveillula taurica* f. *achilleae*
Aegilops crassa	*Blumeria graminis*
Aegilops cylindrica	*Blumeria graminis*
Aegilops triuncialis	*Blumeria graminis*
Alcea nudiflora	*Erysiphe cichoracearum* f. *althaeae*
Alhagi maurorum	*Leveillula alhagi*
Alhagi sp.	*Leveillula alhagi*
Alyssum alyssoides	*Erysiphe cruciferarum*
Alyssum minutum	*Erysiphe cruciferarum*
Alyssum dasycarpum	*Erysiphe cruciferarum*
Alyssum desertorum	*Erysiphe cruciferarum*
Arctium umbrosum	*Erysiphe cichoracearum* f. *cousiniae*
Arctium lappa	*Golovinomyces depressus*
Artemisia oliveriana	*Leveillula compositarum* f. *artemisiae*
Artemisia vulgaris	*Golovinomyces cichoracearum*
Asperugo procumbens	*Erysiphe horridula*
Astragalus sp.	*Leveillula leguminosarum* f. *astragali*
Atraphaxis pyrifolia	*Erysiphe atraphaxis*
Avena fatua	*Blumeria graminis*
Bidens tripartita	*Sphaerotheca fuliginea* f. *bidentis*
Capparis spinosa	*Leveillula capparidacearum* f. *capparidis*
Carthamus lanatus ssp. turkestanicus	*Leveillula compositarum* f. *carthami*
Centaurea besseriana	*Leveillula compositarum* f. *centaureae*
Cichorium intybus	*Golovinomyces cichoracearum* *Sphaerotheca fuliginea*
Chaerophyllum nodosum	*Erysiphe heraclei*
Convolvulus arvensis	*Erysiphe convolvuli* var. *convolvuli*
Cousinia microcarpa	*Erysiphe cichoracearum* f. *cousiniae*
Cousinia sp.	*Erysiphe cichoracearum* f. *cousiniae*
Cousinia coronata	*Leveillula compositarum* f. *cousiniae*
Crambe cordifolia ssp. kotschyana	*Erysiphe communis* f. *crambes*
Crataegus songarica	*Phyllactinia guttata*
Crataegus turkestanica	*Podosphaera oxyacanthae* f. *crataegi* *Phyllactinia guttata*
Crepis pulchra	*Sphaerotheca fuliginea* f. *crepidis*
Crepis sp.	*Erysiphe cichoracearum* f. *crepidis*
Cydonia oblonga	*Podosphaera oxyacanthae* f. *cydoniae*
Datisca cannabina	*Leveillula datiscacearum* f. *datiscae*
Daucus carota	*Leveillula umbelliferarum* f. *dauci*
Delphinium semibarbatum	*Leveillula ranunculacearum* f. *delphinii*
Descurainia sophia	*Erysiphe cruciferarum*

Host plant (scientific name)	Powdery mildew fungi (scientific name)
Dipsacus azureus	*Sphaerotheca fuliginea* f. *dipsaci*
Dodartia orientalis	*Leveillula scrophulariacearum* f. *dodartiae*
Dracocephalum nuratavicum	*Leveillula labiatarum* f. *dracocephali*
Erysimum sp.	*Erysiphe cruciferarum* f.*erysimi*
Euphorbia sp.	*Podosphaera euphorbiae*
Eremogone griffithii	*Leveillula caryophyllacearum* f. *arenariae*
Ferula angreni	*Erysiphe heraclei*
Ferula penninervis	*Erysiphe heraclei*
Fraxinus sogdiana	*Phyllactinia fraxini*
Galium aparine	*Neoerysiphe galii*
Galium pamiroalaicum	*Neoerysiphe galii*
Geranium linearilobum	*Podosphaera fugax*
Geranium pusillum	*Podosphaera fugax*
Geum kokanicum	*Sphaerotheca* sp.
Hedysarum sp.	*Erysiphe communis* f. *hedysari*
Helichrysum nuratavicum	*Leveillula compositarum* f. *helichrysi*
Heracleum lehmannianum	*Leveillula umbelliferarum* f. *heraclei*
Hieracium sp.	*Erysiphe cichoracearum* f. *euhieracium*
Hippophae rhamnoides	*Phyllactinia suffulta* f. *hippophaes*
Hordeum spontaneum	*Blumeria graminis*
Hordeum bulbosum	*Blumeria graminis*
Hypericum perforatum	*Erysiphe hyperici*
Hypericum scabrum	*Leveillula guttiferarum*
Juglans regia	*Erysiphe juglandis*
Lactuca orientalis	*Erysiphe cichoracearum* f. *lactucae*
Lepidium draba	*Leveillula cruciferarum* f. *lepidii*
Lepidolopha komarowii	*Erysiphe cichoracearum* f. *tanaceti*
Ligustrum sp.	*Erysiphe syringae*
Lindelofia anchusoides ssp. macrostyla	*Erysiphe horridula* f. *lindelofiae*
Lomelosia micrantha	*Leveillula datiscacearum* f. *scabiosae*
Lomelosia songarica	*Sphaerotheca fuliginea* f. *scabiosae*
Malus domestica	*Podosphaera leucotricha*
Marrubium anisodon	*Erysiphe labiatarum* f. *marrubii*
Medicago sativa	*Erysiphe communis* f.sp. *medicaginis–sativae* *Leveillula leguminosarum* f. *medicaginis*
Melilotus officinalis	*Erysiphe trifoliorum*
Morus alba	*Phyllactinia suffulta* f. *moricola*
Nepeta schtschurowskiana	*Sphaerotheca fuliginea* f. *lophanthi*
Ornithogalum gulnariense	*Podosphaera fugax*
Onobrychis chorassanica	*Leveillula leguminosarum* f. *onobrychidis*
Origanum vulgare	*Erysiphe labiatarum* f. *origami*

Host plant (scientific name)	Powdery mildew fungi (scientific name)
Peganum harmala	*Leveillula taurica* f. *pegani*
Pentanema britannica	*Erysiphe cichoracearum* f. *inulae*
Phlomis nubilans	*Erysiphe labiatarum* f. *phlomidi* *Leveillula labiatarum* f. *phlomidis*
Phlomis thapsoides	*Leveillula labiatarum* f. *phlomidis*
Phlomoides labiosa	*Erysiphe labiatarum* f. *eremostachydis*
Pistacia vera	*Phyllactinia suffulta* f. *pistaciae*
Plantago lanceolate	*Leveillula plantaginis*, *Podosphaera plantaginis*
Plantago major	*Erysiphe cichoracearum* var. *plantaginis*
Platanus orientalis	*Erysiphe platani*
Poa trivialis	*Poa trivialis*
Poa versicolor	*Blumeria graminis*
Poa bulbosa	*Blumeria graminis*
Polygonum aviculare	*Erysiphe polygoni* f. *polygoni*
Populus afghanica	*Phyllactinia populi*
Potentilla pedata	*Sphaerotheca macularis*
Potentilla reptans	*Erysiphe thuemenii*
Prangos pabularia	*Leveillula umbelliferarum* f. *prangotis*
Pseudosedum lievenii	*Sphaerotheca fuliginea* f. *sedi*
Psychrogeton cabulicum	*Podosphaera fusca*
Prunus persica	*Podosphaera pannosa*
Prunus cerasus	*Podosphaera tridactyla* f. *cerasi*
Prunus erythrocarpa	*Phyllactinia suffulta* f. *pruni* *Podosphaera tridactyla* f. *cerasi*
Prunus bucharica	*Podosphaera pannosa*, *Phyllactinia suffulta* f. *pruni*
Pseudopodospermum inconspicuum	*Leveillula compositarum* f. *scorzonerae*
Pseudoheterocaryum szovitsianum	*Leveillula boraginacearum* f. *lappulae*
Ranunculus sericeus	*Erysiphe aquilegiae* var. *ranunculi*
Rochelia cardiosepala	*Erysiphe horridula* f. *rocheliae*
Rochelia sp	*Erysiphe horridula* f. *rocheliae*
Rosa canina	*Podosphaera pannosa*
Rosa persica	*Podosphaera pannosa*
Rosa beggeriana var. *beggeriana*	*Podosphaera pannosa*
Rosa ecae	*Podosphaera pannosa*
Rumex acetosa	*Erysiphe polygoni* var. *rumicis*
Rumex chalepensis	*Erysiphe polygoni* var. *rumicis*
Salvia austriaca	*Golovinomyces salvia*
Salvia scrophulariifolia	*Leveillula compositarum* f. *perovskia*
Scandix pecten–veneris	*Erysiphe heraclei*
Scutellaria ramosissima	*Leveillula labiatarum* f. *scutellariae*
Semenovia pimpinellioides	*Leveillula umbelliferarum* f. *heraclei*
Solenanthus circinnatus	*Erysiphe horridula* f. *solenanthi* *Leveillula umbelliferarum* f. *seseli*
Solenanthus turkestanicus	*Erysiphe horridula* f. *solenanthi*
Sonchus asper	*Erysiphe cichoracearum* f. *sonchi*
Tanacetopsis mucronata	*Erysiphe cichoracearum* f. *tanaceti*
Taraxacum officinale	*Erysiphe cichoracearum* f. *taraxaci*
Taraxacum maracandicum	*Podosphaera erigerontis–canadensis*
Trifolium pretense	*Erysiphe trifolii*
Thinopyrum intermedium ssp. *intermedium*	*Blumeria graminis*
Ulmus laevis	*Uncinula ulmi*
Urtica dioica	*Erysiphe urticae*
Verbascum songaricum	*Leveillula verbasci*
Verbena officinalis	*Erysiphe cichoracearum* f. *verbenae*
Veronika argute–serrata	*Erysiphe cichoracearum* f. *veronicae*
Vitis vinifera	*Erysiphe necator*
Vickifunkia thomsonii	*Sphaerotheca fuliginea* f. *senecionis*
Ziziphora tenuior	*Erysiphe labiatarum* f. *ziziphorae*

(4 each), Euphorbiaceae, Oleaceae, Plantaginaceae, Ranunculaceae, Rubiaceae, Hypericaceae, Malvaceae (2 each), Capparaceae, Caryophyllaceae, Crassulaceae, Datiscaceae, Elaeagnaceae, Juglandaceae, Anacardiaceae, Moraceae, Peganaceae, Platanaceae, Salicaceae, Ulmaceae, Urticaceae, Verbenaceae, Vitaceae (1 each).

The highest number of powdery mildew species was reported in the following host genera: *Plantago*, *Prunus* (3 species each, 5.26% of the total species number), *Cichorium*, *Arctium*, *Artemisia*, *Cousinia*, *Crataegus*, *Crepis*, *Lomelosia*, *Medicago*, *Phlomis*, *Potentilla*, *Salvia*, *Solenanthus* and *Taraxacum* (2 species each, 3.50%), while other plant genera host one powdery mildew species per genus.

The recorded powdery mildew species were found on 31 medicinal species such as *Alcea nudiflora*, *Alhagi maurorum*, *Capparis spinosa*, *Cichorium intybus*, *Crataegus songarica*, *C. turkestanica*, *Crambe cordifolia* ssp. *kotschyana*, *Hippophae rhamnoides*, *Hypericum perforatum*, *Juglans regia*, *Malus domestica*, *Medicago sativa*, *Morus alba*, *Nepeta schtschurowskiana*, *Pistacia vera*, *Plantago lanceolate*, *P. major*, *Prunus erythrocarpa*, *P. bucharica*, *Helichrysum nuratavicum*, *Rosa canina*, *R. persica*, *R. beggeriana* var. *beggeriana*, *R. ecae*, *Rumex acetosa*, *R. chalepensis*, *Taraxacum*

officinale, *T. maracandicum*, *Urtica dioica*, *Vitis vinifera*, *Ziziphora tenuior* etc.

This work represents itself as a checklist of powdery mildew fungi in the Jizzakh region of protected areas. The fungal species listed below have been arranged in alphabetical order.

Blumeria graminis (DC.) Speer

(= Erysiphe communis f. graminis (DC.) Fr., Alphitomorpha communis var. graminearum Wallr., Erysiphe graminis DC., Tigria graminis (DC.) Trevis.)

Host: Poaceae

Poa trivialis (2015) NNR (Xayatsay V.) - First record on Poa trivialis in Uzbekistan.

Poa versicolor (2015) NNR (Tikchasay V.)

Poa bulbosa (2010), NNR (Beshbarmoq V.) (2019–2022) ZNNP (Usmanlisay, Qorongisay V.)

Thinopyrum intermedium subsp. intermedium (=Agropyron trichophorum) (2022) ZNNP (Ettikechuvsay V.)

Aegilops crassa (2010) NNR (Xayatsay V.)

Aegilops cylindrica (2012), NNR (Qarisay V.)

Aegilops triuncialis (2022) ZNNP (Usmanlisay V.)

Hordeum bulbosum (1983) ZNR (Kulsay V.), (2009–20120) NNR (Xayatsay V.), (2019) ZNNP (Usmanlisay V.), (2021) ZNNP (Boytepa V.)

Hordeum spontaneum (2021) ZNNP (Qo'riq V.)

Avena fatua (2022) ZNNP (Usmanlisay V.)

Erysiphe aquilegiae var. **ranunculi** (Grev.) R.Y. Zheng & G.Q. Chen.

Host: Ranunculaceae

Ranunculus sericeus (2016) NNR (Xayatsay V.).

E. atraphaxis (Golovin) U. Braun & S. Takam.

Host: Polygonaceae

Atraphaxis pyrifolia (2019) ZNNP (O'riklisay V.).

E. communis f. ***crambes*** Jacz.

Host:Brassicaceae

Crambe cordifolia ssp. *kotschyana* (Boiss.) Jafri. (2014) NNR (Gurdara V.), (2021) ZNNP (Qorong'isay V.).

E. communis f. ***dianthi*** Jacz.

Host: Caryophyllaceae

Dianthus helenae (2017) NNR (Beshbarmaq V.).

E. communis f. ***hedysari*** Jacz.

Host: Fabaceae

Hedysarum sp.- (2010) NNR (Beshbarmaq V.).

E. communis f. sp. ***medicaginis-sativae*** Hammarl.

Host: Fabaceae

Medicago sativa (2019) ZNNP (O'riklisay V.).

E. cichoracearum f. ***althaeae*** Jacz.

Host: Malvaceae

Alcea nudiflora (2010) NNR (Xayatsay V.), (2019) ZNNP (O'riklisay V.).

E. cichoracearum f. ***lactucae*** Jacz.

Host: Asteraceae

Lactuca orientalis (2010) NNR (Xayatsay V.), (2012) NNR (Majrumsay V.) - Note: First record on *Lactuca orientalis* in Uzbekistan.

E. cichoracearum f. ***tanaceti*** Jacz.

Host: Asteraceae

Lepidolopha komarowii (2015) NNR (Xayatboshi V.) - Note: First record on *Lepidolopha komarowii* in Uzbekistan.

E. cichoracearum f. ***veronicae*** Jacz.

Host: Scrophulariaceae

Veronica argute-serrata (2010) NNR (Beshbarmoq V.).

E. cichoracearum f. ***verbenae*** Jacz.

Host: Verbenaceae

Verbena officinalis (2010) NNR (Xayatboshi V.), (2017) NNR (Xayatsay V.).

E. cichoracearum f. ***crepidis*** Jacz.

Host: Asteraceae

Crepis sp. (2019) ZNNP (Ettikechuvsay V.).

E. cichoracearum f. ***euhieracium*** S. Blumer.

Host: Asteraceae

Hieracium sp. (2019) ZNNP (Sherbulaq V.).

E. cichoracearum f. ***tanaceti*** Jacz.

Host: Asteraceae

Tanacetopsis mucronata (2019) ZNR (Qizilmazar V.).

E. cichoracearum f. ***taraxaci*** Jacz .

Host: Asteraceae

Taraxacum officinale – (2021) ZNNP (Boytepa V.).

E. cichoracearum f. ***sonchi*** Jacz .

Host: Asteraceae

Sonchus asper (2021) ZNNP (Sherbulaq, Irg'aylisay V.).

E. cichoracearum f. ***cousiniae*** (Jacz). Golov.
Host: Asteraceae
Cousinia sp. (2021) ZNNP (Boytepa V.).
Cousinia microcarpa (2022) ZNNP (O'riklisay).

E. cichoracearum var. ***plantaginis*** (Link).
Host: Plantaginaceae
Plantago major (2021) ZNNP (Qorong'isay V.).

E.cichoracearum f. ***inulae*** Jacz .
Host: Asteraceae
Pentanema britannica (2022) ZNNP (Irg'aylisay V.)

E. cruciferarum Opiz ex L. Junell.
(= *Erysiphe communis* (Wallr.) Link., *Erysiphe communis* (Wallr.) Schltdl., *Erysiphe cruciferarum var. longispora* G.J.M. Gorter., *Erysiphe pisi* var. *cruciferarum* (Opiz ex L. Junell) Ialongo., *Erysiphe radulescui* Docea.)
Host: Brassicaceae
Alyssum dasycarpum (2010–2012) NNR (Tikchasay, Qarisay V.).
Alyssum alyssoides (2010) NNR (Xayatsay V.).
Alyssum desertorum (2020) ZNNP (Sufa V.), (2022) ZNNP (Qorong'isay V.).
Alyssum minutum (2020) ZNNP (Usmanlisay V.)
Descurainia sophia (2022) ZNNP (Usmanlisay V.) - Note: First record on *Descurainia sophia* in Uzbekistan.

E. cruciferarum f. ***erysimi*** (Jacz).
Host: Brassicaceae
Erysimum sp. (2022) ZNNP (Usmanlisay V.).

E. convolvuli var. ***convolvuli***
Host: Convolvulaceae
Convolvulus arvensis (2010) NNR (Xayatsay V.), (2021) ZNNP (Usmanlisay V.).

E. horridula f. ***asperuginis*** S. Blumer.
Host: Boraginaceae
Asperugo procumbens (2010) NNR (Xayatsay V.), (2019) ZNNP (O'riklisay V.).

E. horridula f. ***lindelofiae*** Golovin.
Host: Boraginaceae
Lindelofia anchusoides ssp. *macrostyla* (2010) NNR (Beshbarmoq Mt.), (2018) ZNNP (O'riklisay).

E. horridula f. ***rocheliae*** Golovin.
Host: Boraginaceae
Rochelia sp. (2009) NNR (Tikchasay V.) *Rochelia cardiosepala* (2012) NNR (Qarisay, Gurdara V.).

E. horridula f. ***solenanthi*** Jacz.
Host: Boraginaceae
Solenanthus circinnatus (2010) NNR (Parandoz V.).
Solenanthus turkestanicus (2011) NNR (Majrumsay V.).

E. heraclei DC.
(= *Erysiphe heraclei* var. *himalayensis* Y.S. Paul & V.K. Thakur.)
Host: Apiaceae
Ferula penninervis (2017) NNR (Xayatsay, Beshbarmaq V.) - Note: First record on *Ferula penninervis* in Uzbekistan.
Ferula angreni (2017) NNR (Xayatsay V.)- First record on *Ferula angreni* in Uzbekistan.
Chaerophyllum nodosum (2014) NNR (Gurdara V.).
Scandix pecten veneris (2012) NNR (Xayatsay V.), (2019) ZNNP (Boytepa V.), (2022) ZNNP (Qorong'isay V.).

E. thuemenii U. Braun (= *E. communis* f. *potentillae* Jacz).
Host: Rosaceae
Potentilla reptans (2019) ZNNP (Usmanlisay V.).
E. trifolii Grev. (= *Erysiphe martii* Lév., *Microsphaera martii* (Lév.) YS Paul & VK Thakur., *Microsphaera trifolii* (Grev.) U. Braun).
Host: Fabaceae
Trifolium pretense (2021) ZNNP (Usmanlisay V.).

E. trifoliorum (Wallr.) U. Braun.
Host: Fabaceae
Melilotus officinalis (2019) ZNNP (O'riklisay V.).

E. hyperici (Wallr.) S. Blumer.
Host: Hypericaceae
Hypericum perforatum (2012) NNR (Qarisay V.).

E.juglandis (Golovin) U. Braun & S. Takam.
(= *Microsphaera juglandis* Golovin.).
Host: Juglandaceae
Juglans regia (2019) ZNNP (Usmanlisay V.).

E. labiatarum f. ***origani*** (H.A. Dietr.) Jacz.
Host: Lamiaceae
Origanum vulgare (2014) NNR (Parandoz V.).

E. labiatarum f. ***phlomidis*** Jacz.
Host: Lamiaceae

Phlomis nubilans (2014), NNR (Majrumsay V.).

E. labiatarum f. ***leonuri*** Jacz.
Host: Lamiaceae
Leonurus turkestanicus (2017), NNR (Xayatboshi V.).

E. labiatarum f. ***ziziphorae*** Pospelov.
Host: Lamiaceae
Ziziphora tenuior (2019) ZNNP (Yettikechuvsay V.).

E. labiatarum f. ***eremostachydis*** Golovin.
Host: Lamiaceae
Phlomoides labiosa (1983) ZNR (Guralashsay V.).

E. labiatarum f. ***marrubii*** Jacz.
Host: Lamiaceae
Marrubium anisodon (2021) ZNNP (Qorong'isay V.).

E. necator Schwein.
(= *Erysiphe necator* var. *ampelopsidis* (Peck) U. Braun & S. Takam., *Oidium tuckeri* Berk., *Uncinula americana* Howe., *Uncinula ampelopsidis* Peck., *Uncinula necator* (Schwein.) Burrill., *Uncinula necator* var. *ampelopsidis* (Peck) U. Braun.).
Host: Vitaceae
Vitis vinifera (2016) NNR (Qarisay V.), (2022) ZNNP (Qorong'isay V.).

E. platani (Howe) U. Braun (= *Microsphaera platani* Howe.)
Host: Platanaceae
Platanus orientalis (2022) ZNNP (Usmanliysay V.) - Note: First report in Uzbekistan.

E. polygoni f. ***polygoni*** DC.
Host: Polygonaceae
Polygonum aviculare (2010) NNR (Qarisay V.), (2019) ZNNP (O'riklisay V.), (2022) ZNNP (Usmanliysay V.).

E. polygoni var. ***rumicis*** Y.S. Paul & V.K. Thakur.
Host: Polygonaceae
Rumex chalepensis (2017) NNR (Xayatsay V.).
Rumex acetosa (2021) ZNNP (Usmanliysay V.).

E. syringae Schwein. (= *Microsphaera syringae* (Schwein.) H. Magn.).
Host: Oleaceae
Ligustrum sp. (2022) ZNNP (Qorong'isay V.) - Note: First report in Uzbekistan.

E. urticae (Wallr.) S. Blumer
Host: Urticaceae
Urtica dioica (2014) NNR (Xayatsay V.).

Golovinomyces cichoracearum (DC.) VP Heluta.
(= *Erysiphe communis* var. *cichoracearum* (DC.) Link., *Erysiphe cichoracearum* var. *luvungae* M.S. Patil & Maham., *Erysiphe cichoracearum* var. *saussureae* Y.S. Paul & V.K. Thakur., *Erysiphe cichoracearum* var. *transvaalensis* G.J.M. Gorter & Eicker., *Golovinomyces cichoracearum* var. *latisporus* (U. Braun) U. Braun., *Golovinomyces cichoracearum* var. *transvaalensis* (G.J.M. Gorter & Eicker) U. Braun., *Oidium asteris-punicei* Peck., *Oidium tabaci* Thüm.).
Host: Asteraceae
Artemisia vulgaris (2019) ZNR (Qashqasuv V.).

G. salviae (Jacz.) M. Scholler, U. Braun & Anke Schmidt.
(= *Erysiphe biocellata var. salviae* (Jacz.) VP Heluta., *Erysiphe labiatarum* f. *salviae* Jacz., *Erysiphe salviae* (Jacz.) S. Blumer., *Leveillula labiatarum* f. *salviae* (Jacz.) Golovin.).
Host: Lamiaceae
Salvia austriaca (2017) NNR (Xayatsay V.).

G. depressus (Wallr.) VP Heluta.
(=*Erysiphe cichoracearum* f. *bardanae* (Wallr.) Jacz., *Erysiphe communis* f. *depressa* (Wallr.) Fr., *Erysiphe depressa* (Wallr.) Link., *Erysiphe depressa var. artemiciae* Link., *Erysiphe depressa* var. *bardanae* Wallr.).
Host: Asteraceae
Arctium lappa (2009) NNR (Xayatsay V.).

Golovinomyces cichoracearum (DC.) VP Heluta.
(= *Erysiphe communis* var. *cichoracearum* (DC.) Link., Erysiphe cichoracearum DC., *Erysiphe cichoracearum* f. *cichorii* S. Blumer., *Erysiphe cichoracearum* var. *latispora* U. Braun., *Erysiphe cichoracearum* var. *luvungae* M.S. Patil va Maham., *Erysiphe cichoracearum* var. *saussureae* Y.S. Pol va VK Thakur., *Erysiphe cichoracearum* var. *transvaalensis* G.JM Gorter & Eicker., *Golovinomyces cichoracearum* var. *latisporus* (U. Braun) U. Braun., *Golovinomyces cichoracearum* var. *transvaalensis* (GJM Gorter & Eicker) U. Braun., *Oidium asteris-punicei* Peck., *Oidium tabaci* Thüm.).
Host: Asteraceae
Cichorium intybus (2017) NNR (Xayatsay V.).

***Leveillula alhagi* (**Sorokīn) U. Braun.
(= *Erysiphe alhagi* Sorokīn., *Leveillula leguminosarum* f. *alhagi* (Sorokīn) Golovin.).
Host: Fabaceae
Alhagi sp. (2009) NNR (Xayatsay V.), (2017) NNR (Majrumsay V.).
Alhagi maurorum (2021) ZNNP (Boytepa V.).

L. boraginacearum* f. *lappulae (Jacz). Golov.
Host: Boraginaceae
Pseudoheterocaryum szovitsianum (2022) ZNNP (O'riklisay V.) - Note: First record on *Pseudoheterocaryum szovitsianum* in Uzbekistan.

L.capparidacearum* f. *capparidis (Jacz.) Golovin.
Host: Capparaceae
Capparis spinosa (2019–2021) ZNNP (O'riklisay, Usmanlisay V).

L. caryophyllacearum* f. *arenariae Golovin.
Host: Caryophyllaceae
Arenaria griffithii (2015–2016) NNR (Xaytbashi V.).

L. compositarum* f. *scorzonerae (Kuprev.) Golovin.
Host: Asteraceae
Pseudopodospermum inconspicuum (2022) ZNNP (Ettikechuvsay V.).

L. compositarum* f. *artemisiae (Jacz.) Golovin.
Host: Asteraceae
Artemisia oliveriana (2017) NNR (Majrumsay V.) - Note: First record on *Artemisia oliveriana* in Uzbekistan.

L. compositarum* f. *helichrysi (Jacz.) Golovin.
Host: Asteraceae
Helichrysum nuratavicum (2015) NNR (Fargun V.) - Note: First record on *Helichrysum nuratavicum* in Uzbekistan.

L. compositarum* f. *centaureae (Jacz.) Golovin.
Host: Asteraceae
Centaurea besseriana (2010-2014) NNR (Xayatbashi - Majrumsay V.).

L. compositarum* f. *carthami (Jacz.) Golovin.
Host: Asteraceae
Carthamus lanatus ssp. turkestanicus (2015) NNR (Xayatsay V.).

L. compositarum* f. *cousiniae (Jacz.) Golovin.
Host: Asteraceae
Arctium umbrosum (2016) NNR (Tikchasay V.).
Cousinia coronata (2019) ZNNP (Yettikechuvsay V.).

L. compositarum* f. *perovskiae Kurbana.
Host: Lamiaceae
Salvia scrophulariifolia (2017) NNR (Beshbarmaq V.).

L. cruciferarum* f. *lepidii (Jacz.) Golovin.
Host: Brassicaceae
Lepidium draba (2014) NNR (Xayatsay V.).

L. datiscacearum* f. *datiscae (Jacz.) Golovin.
Host: Datiscaceae
Datisca cannabina (2014) NNR (Majrumsay V.), (2016) NNR (Tikchasay V.).

L. dipsacacearum* f. *scabiosae (Jacz.) Golovin.
Host: Dipsacaceae
Lomelosia micrantha (2022) ZNNP (Usmanlisay V.).

L. guttiferarum Golovin.
Host: Hypericaceae
Hypericum scabrum (2016) NNR (Tikchasay V.).

L. labiatarum* f. *dracocephali Golovin.
Host: Lamiaceae
Dracocephalum nuratavicum (2015) NNR (Andibaraut V.) - Note: First record on *Dracocephalum nuratavicum* in Uzbekistan.

L. labiatarum* f. *scutellariae (Jacz.) Golovin.
Host: Lamiaceae
Scutellaria ramosissima (2015) NNR (Xayatbashi-Xayatsay V.) - Note: First record on *Scutellaria ramosissima* in Uzbekistan.
Scutellaria sp.- (2016) NNR (Tikchasay V.).

L. labiatarum* f. *phlomidis (Jacz.) Golovin.
Host: Lamiaceae
Phlomis thapsoides (2010) NNR (Xayatsay V.).
Phlomis nubilans (2015) NNR (Fargun V.) - Note: First record on *Phlomis nubilans* in Uzbekistan.

L. leguminosarum* f. *astragali (Jacz.) Golovin.
Host: Fabaceae
Astragalus sp. (20221) ZNNP (Sherbuloq V.).

L. leguminosarum* f. *onobrychidis Golovin.
Host: Fabaceae

Onobrychis chorassanica (2015) NNR (Fargun V.).

L. leguminosarum f. ***medicaginis*** (Jacz.) Golovin.
Host: Fabaceae
Medicago sativa (2017) NNR (Xayatsay V.).

L. plantaginis Golovin.
Host: Plantaginaceae
Plantago lanceolata (2010) NNR (Xayatsay V.).

L. scrophulariacearum f. ***dodartiae*** (Jacz.) Golovin.
Host: Scrophulariaceae
Dodartia orientalis (2010) NNR (Xayatbashi V.).

L. taurica f. ***pegani*** Jacz.
Host: Peganaceae
Peganum harmala (2010) NNR (Tikchasay V.).

L. taurica f. ***achilleae*** Jacz.
Host: Asteraceae
Achillea sp. (2019) ZNNP (O'riklisay V.).

L. umbelliferarum f. ***dauci*** Golovin.
Host: Apiaceae
Daucus carota (2010) NNR Xayatsay V.).

L. umbelliferarum f. ***seseli*** Golovin.
Host: Boraginaceae
Solenanthus circinnatus (2015) NNR (Xayatbashi V.).

L. umbelliferarum f. ***prangotis*** Golovin.
Host: Apiaceae
Prangos pabularia (2017) NNR (Xayatsay V.).

L. umbelliferarum f. ***heraclei*** Golovin.
Host: Apiaceae
Heracleum lehmannianum (2018) ZNNP (O'riklisay V.).
Semenovia pimpinelloides (2022) ZNNP (Qorong'isay V.) - Note: First record on *Semenovia pimpinelloides* in Uzbekistan.

L. ranunculacearum f. ***delphinii*** Golovin.
Host: Ranunculaceae
Delphinium semibarbatum (2019) ZNNP (Yettikechuvsay V.).

L. verbasci (Jacz.) Golovin. (= *Leveillula taurica* f. *verbasci* Jacz.).
Host: Scrophulariaceae
Verbascum songaricum (2015) NNR (Tikchasay V.), (2016) NNR (Xayatbashi V.).

Neoerysiphe galii (S. Blumer) U. Braun.
(= *Erysiphe galii* S. Blumer).
Host: Rubiaceae
Galium aparine - (1983) ZNR (Kulsay V.), (2022) ZNNP (O'riklisay V.).
Galium pamiroalaicum (2016) NNR (Parandoz V.).

Phyllactinia suffulta f. ***pistaciae*** Jacz.
Host: Anacardiaceae
Pistacia vera (2015) NNR (Xayatsay V.), (2021) ZNNP (Boytepa V.).

P. populi (Jacz.) Y.N. Yu.
(= *Phyllactinia suffulta* f. *populi* Jacz.).
Host: Salicaceae
Populus afghanica (2014) NNR (Majrumsay V.), (2019–2021) ZNNP (Qorong'isay-O'riklisay V.).

P. suffulta f. ***pruni*** Golov.
Host: Rosaceae
Prunus bucharica (2019–2021) ZNNP (O'riklisay – Usmanliysay V.).
Prunus erythrocarpa (2018) ZNNP (O'riklisay V.).

P. suffulta f. ***hippophaes*** Jacz.
Host: Elaeagnaceae
Hippophae rhamnoides (2022) ZNNP (Umanlisay V.).

P. suffulta f. ***moricola*** Jacz.
Host: Moraceae
Morus alba (2009–2010–2016) NNR (Xayatsay, Tikchasay V.), (2021) ZNNP (Qorong'isay V.).

P. guttata (Wallr.) Lév.
(= *Phyllactinia berberidis* Palla., *Phyllactinia betulae* (DC.) Fuss., *Phyllactinia corylea* (Pers.) P. Karst., *Phyllactinia suffulta* (Rebent.) Sacc.).
Host: Rosaceae
Crataegus turkestanica (2017) NNR (Xayatsay V.).
Crataegus songarica (2022) ZNNP (Yettikechuvsay V.).

P. fraxini (DC.) Fuss.
(= *Erysiphe communis f. lamprocarpa* (Wallr.) Fr., *Erysiphe fraxini* DC., *Erysiphe lamprocarpa* (Wallr.) Link.).
Host: Oleaceae
Fraxinus sogdiana (2017) NNR (Qarisay V.).

Podosphaera euphorbiae (Castagne) U. Braun & S. Takam.
(= *Sphaerotheca euphorbiae* (Castagne) E.S. Salmon., *Sphaerotheca tomentosa* G.H. Otth.).
Host: Euphorbiaceae
Euphorbia sp. (2016) NNR (Tikchasay V.).

P. fugax (Penz. & Sacc.) U. Braun & S. Takam.
(=*Erysiphe communis var. geranii* Klotzsch., *Sphaerotheca fugax* Penz. & Sacc.).
Host: Geraniaceae
Geranium linearilobum (2013) NNR (Gurdara V.).
Geranium pusillum (2010) NNR (Tikchasay V.).
Geranium rotundifolium (2012) NNR (Gurdara V.) - Note: First record on *Geranium rotundifolium* in Uzbekistan.

P. fusca (Fr.) U.Braun va Shishkoff.
(= *Podosphaera phaseoli* (Z.Y. Zhao) U. Braun & S. Takam., *Podosphaera xanthii* (Castagne) U.Braun & Shishkoff., *Sphaerotheca astragali* var. *phaseoli* Z.Y.Zhao., *S. calendulae* (Malbr. & Roum.) Malbr., *S. cucurbitae* (Jacz.) Z.Y.Zhao., *S. fuliginea* f. *calendulae* (Malbr. & Roum.) Jacz., *S. fuliginea* f. *cucurbitae* Jacz., *S. fusca* (Fr.) S. Blumer., *S. fuscata* (Berk. & M.A.Curtis) Serbinow., *S. indica* Patw., *S. melampyri* L. Junell., *S. microcarpa* Hazsl., *S. phaseoli* (Z.Y.Zhao) U.Braun., *S. verbenae* Săvul. & Negru., *S. xanthii* (Castagne) L. Junell.).
Host: Asteraceae
Psychrogeton cabulicum (2016) NNR (Tikchasay V.).

P. tridactyla f. ***cerasi*** Jacz.
Host: Rosaceae
Prunus cerasus (2017) NNR (Xayatsay V.).
Prunus erythrocarpa (2018) ZNNP (O'riklisay V.).

P. leucotricha (Ellis & Everh.) E.S.Salmon.
(= *Sphaerotheca leucotricha* Ellis & Everh.).
Host: Rosaceae
Malus domestica (2009) NNR (Majrumsay V.), (2021) ZNNP (Ettikechuvsay V.).

P. erigerontis-canadensis (Lév.) U.Braun & T.Z.Liu. (= *Erysiphe erigerontis-canadensis* Lév., *Sphaerotheca erigerontis-canadensis* (Lév.) L. Junell.).
Host: Asteraceae
Taraxacum maracandicum (1983) ZNR (Guralashsay V.).

P. euphorbiae (Castagne) U. Braun & S. Takam.
(= *Sphaerotheca euphorbiae* (Castagne) E.S. Salmon., *S. tomentosa* G.H. Otth.).
Host: Euphorbiaceae
Euphorbia sp. (2016) NNR (Xayatsay V.).

P. oxyacanthae f. ***cydoniae*** Jacz.
Host: Rosaceae
Cydonia oblonga (1956) ZNR (Guralashsay V.).

P. oxyacanthae f. ***crataegi*** Maurizio.
Host: Rosaceae
Crataegus turkestanica (2021) ZNNP (Yetikechuvsay V.).

P. plantaginis (Castagne) U.Braun & S.Takam.
(= *Erysiphe plantaginis* Castagne., *Sphaerotheca plantaginis* (Castagne) L.Junell.)
Host: Plantaginaceae
Plantago lanceolata (2016) NNR (Tikchasay V.).

P. pannosa (Wallr.) de Bary.
(= *Erysiphe pannosa* (Wallr.) Link., *Leucothallia pannosa* (Wallr.) Trevis., *Oidium forsythiae* Bunkina., *O. leucoconium* Desm., *O. leuconium* Desm., *Sphaerotheca macularis* f. *rosae* Jacz., *S. pannosa* (Wallr.) Lév., *S. pannosa* var. *persicae* Woron., *S. pannosa* var. *rosae* Woron., *S. persicae* (Woron.) Erikss., *S. rosae* (Jacz.) Z.Y.Zhao.).
Host: Rosaceae
Rosa canina (2010-2012) NNR (Xayatsay - Gurdarasay V.).
Rosa beggeriana var. *tilanchi* (2011) NNR (Majrumsay V.), (2021) ZNNP (Sufa-Usmanlisay V.).
Rosa persica (2011–2017) NNR (Xayatsay V.).
Rosa ecae (2021–2022) ZNNP (Yetikechuvsay - O'riklisay V.).
Prunus bucharica (2012) NNR (Tikchasay V.).
Prunus persica (2009) NNR (Xayatsay V.).

Sphaerotheca fuliginea f. ***scabiosae*** Jacz.
Host: Dipsacaceae
Lomelosia songarica (1983) ZNR (Guralashsay V.), (2010) NNR (Beshbarmaq V.).

S. fuliginea f. ***crepidis*** Jacz.
Host: Asteraceae
Crepis pulchra (2019) ZNNP (O'riklisay V.).

S. fuliginea f. ***senecionis*** Jacz.
Host: Asteraceae
Vickifunkia thomsonii (2022) ZNNP (Irgaylisay V.).

S. fuliginea f. ***bidentis*** Jacz.
Host: Asteraceae
Bidens tripartite (2018) ZNNP (O'riklisay V.).

S. fuliginea f. ***dipsaci*** Jacz.
Host: Dipsacaceae
Dipsacus azureus (2010) NNR (Beshbarmaq V.), (2021) ZNNP (Usmanlisay V.).

S. fuliginea f. ***lophanthi*** Jacz.
Host: Lamiaceae
Nepeta schtschurowskiana (2015–2016–2017) NNR (Xayatbashi, Tikchasay, Beshbarmaq V.) - Note: First record on *Lophanthus schtschurowskianus* in Uzbekistan.

S. fuliginea f. ***sedi*** Kalymb.
Host: Crassulaceae - *Pseudosedum lievenii* (2012) NNR (Gurdara V.) - Note: First record on *Pseudosedum lievenii* in Uzbekistan.

S. macularis f. ***potentillae*** Jacz.
Host: Rosaceae
Potentilla pedata (2016) NNR (Tikchasay V.).

***Sphaerotheca* sp.**
Host: Rosaceae
Geum kokanicum (2015) NNR (Xayatboshi V.) - Note: First record on *Geum kokanicum* in Uzbekistan.

Uncinula ulmi M.N.Kusnezowa.
Host: Ulmaceae
Ulmus laevis (2017) NNR (Qarisay V.).

DISCUSSION

It is known that the diversity of the powdery mildew fungi is closely related to the diversity of the plant flora. Uzbekistan's plant flora consists of more than 4,500 species and 88 species (334 forms) of powdery mildew fungi were registered on 778 host plant species (Gaponenko et al. 1983). The plant flora from protected areas of the Jizzakh region includes 1986 species of 645 genera and 115 families (Tojibaev et al. 2015) and found 57 species, 69 forms and 4 variaties of powdery mildew on 137 host plant species from 34 families.

The distribution of powdery mildew species in host plants is given based on the regions of Jizzakh region in which they are distributed. The largest number of powdery mildew and host plants were found in the Nuratau Nature Reserve (8 genera, 40 species, 41 forms, 3 forms, of the total species number 70.17%), followed by the Zaamin National Nature Park (7 genera, 35 species, 32 forms, 3 varieties, of the total species number 61.40%), Zaamin Nature Reserve (8 genera, 20 species, 36 forms, 2 varieties, of the total species number 35.08 %).

It is noted that studies on powdery mildew fungi of many regions of Uzbekistan including the Anger river basin, and Fergana valley carried out by some mycologists (Panfilova & Gaponenko 1963; Gaponenko et al. 1983; Abdurazakov et al. 2021). The diversity of powdery mildew fungi in protected areas of the Jizzakh region has been compared with their research results (Table 2).

This diversity of powdery mildew fungi of protected areas of the Jizzakh region is represented by 9 genera and 57 species, 69 forms and 4 variaties species and has approximately 30.80% of the currently known mildew fungi biota of Uzbekistan. On the territory of protected areas of the Jizzakh region, the powdery mildew diseases occur frequently and severely damage plants belonging to *Aegilops*, *Alhagi*, *Artemisia*, *Alyssum*, *Capparis*, *Cousinia*, *Convolvulus*, *Ferula*, *Morus, Populus*, *Rosa*, *Rumex*, and *Trifolium*.

The present checklist is the third work about powdery mildew microfungi of Uzbekistan and serves as one of the sources for a complete list of powdery mildew microfungi of the Rebuplic of Uzbekistan.

Table 2. Comparison of the powdery mildew diversity of protected areas of the Jizzakh region with other regions of Uzbekistan.

Study areas	Plant flora species	Powdery mildew	Powdery mildew host plant species (Percentage towards overall flora)
Uzbekistan (Gaponenko et al. 1983)	4500	88 species, 334 forms	778 (17.28 %)
Angren river basin (Panfilova & Gaponenko 1963)	1500	25 species, 100 forms and 4 varieties	164 (10.93%)
Fergana Valley (Abdurazakov et al. 2021)	2625	67 species	153 (5.82%)
Jizzakh region (this research)	1986	57 species, 69 forms and 4 varieties	137 (6,89 %)

REFERENCES

Abdurazakov, A.A., T.S. Bulgakov, T.N. Kholmuradova & Y.S. Gafforov (2021). Powdery mildew fungi (*Erysiphaceae*) of the Fergana Valley (within Uzbekistan): a first annotated checklist. *Новости систематики низших растений — Novosti sistematiki nizshikh rastenii* 55(1): 55–78. https://doi.org/10.31111/nsnr/2021.55.1.55

Alibekov, L.A. (2013). Geographical foundations of the Zaamin National Park and geoecological problems. Toolkit. Tashkent. 38 pp. (In Uzbek).

Braun, U. (1987). A monograph of the Erysiphales (powdery mildews). *Beihefte zur Nova Hedwigia*, Germany, 89, 1–700 pp.

Braun, U. & R.T. Cook (2012). Taxonomic manual of the Erysiphales (powdery mildews). CBS Biodiversity series. Vol. 11. CBS-KNAW Fungal Biodiversity Centre, Utrecht, Netherlands, 707 p.

Gafforov, Y.S. (2004). Micromycetes on vascular plants of Namangan province: PhD thesis, Tashkent, 21 pp. (In Uzbek.).

Gaponenko, N.I. (1965). Obzor gribov Bukharskoi oblasti [Overview of fungi in Bukhara Region]. AN UzSSR. Tashkent, 61-62 pp. (In Russ.).

Gaponenko, N.I., F.G. Akhmedova, S.S. Ramazanova, M.Sh. Sagdulayeva & Kh.M. Kirgizbayeva (1983). Flora gribov Uzbekistana. T. I. Muchnistorosyanye griby [Fungal Flora of Uzbekistan. Vol. I. Powdery mildew fungi]. Fan. Tashkent, 361 p. (In Russ.).

Golovin, P.N. (1949). Mikoflora Sredney Azii. T. 1. Muchnistorosyanyye griby Sredney Azii [Mycoflora of Central Asia. T. 1. Powdery fungi of Central Asia]. Tashkent, 145 p. (In Russ.).

Heluta V.P., S.P. Wasser & S.O. Voityuk (2004). *Sphaerotheca parietariae* (*Erysiphales, Ascomycota*), a new powdery mildew fungus in Europe. *Flora Mediterranea*. 14. 285-289.

Heluta, V.P. (1989). Flora gribov Ukrainy. Muchnistorosyanye griby [The fungal flora of Ukraine. Powdery mildews]. Naukova Dumka, Kiev, 255 p. (in Russ.).

Kamilov, Sh.G. (1991). Micromycetes on vascular plants of the Botanical Garden of the Academy of Sciences of Uzbekistan. F.N.Rusanova: PhD thesis, Tashkent, 22 p. (In Russ.).

Mustafaev, I.M., N.Y. Beshko & M.M. Iminova (2019). Checklist of ascomycetous microfungi of the Nuratau Nature Reserve (Uzbekistan). *Новости систематики низших растений — Novosti sistematiki nizshikh rastenii* 53(2). 315–332. https://doi.org/10.31111/nsnr/2019.53.2.315

Mustafaev, I.M. (2018). Micromycetes on vascular plants of Nuratau nature Reserve: PhD thesis, Tashkent, 20 p. (In Uzbek.).

Nabieva, D.B., I.M. Mustafaev & M.M. Iminova (2021). First report of *Erysiphe australiana* from Uzbekistan. *New disease reports* 44: e12032. https://doi.org/10.1002/ndr2.12032

Nuraliev, H.H. (1999). Micromycetes on vascular plants of Kashkadarya province: PhD thesis, Tashkent, 22 p. (In Uzbek.).

Panfilova, T.S. & N.I. Gaponenko (1963). *Mikoflora basseina r. Angren* [Mycoflora of Angren River basin]. AN UzSSR, Tashkent, 208 p. (In Russ.).

Pap, P., B. Ranković & S. Maširević (2013). Effect of temperature, relative humidity and light on conidial germination of oak powdery mildew (*Microsphaera alphitoides* Griff. et Maubl.) under controlled conditions. *Archives of Biological Sciences,* Belgrade, 65 (3), 1069-1077. https://doi.org/10.2298/ABS1303069P

Pawar, V.P. & V.A. Patil (2011). Occurrence of powdery mildew on some wild plants from Khandesh region of Maharashtra state. *Recent Research in Science and Technology* 3(5): 94–95.

Rahimova, E.V., G.A. Nam & B.D. Ermekova (2014). Short determinant of powder mildew fungi of Kazakhstan and borger area. Novosibirsk, 129 p. (In Russ.)

Rotkevich, T.K. (1960). Materials for the microflora of the former mountain-juniper reserve Guralash (northern spurs of the Turkestan ridge). Materials of the 1st coordination meeting of mycologists of the republics of Central Asia and Kazakhstan. Frunze, 142-143 pp. (in Russ.).

Solieva, Y.S. (1989). Micromycetes on vascular plants of Surkhandarya province: PhD thesis. Tashkent, 23 p. (In Russ.).

Tojibaev, K.Sh., N.Y. Beshko, V.A. Popov, C.G. Jang & K.S. Chang (2017). *Botanical Geography of Uzbekistan*. Pocheon, Republic of Korea, 250 p.

Tojibaev, K.S., N.Y. Beshko, A.R. Batoshov & D.E. Azimova (2015). Cadastre of flora of Jizzakh region of Uzbekistan (vascular plants). Chinor ENK, Tashkent, 3-238 pp.

Zaprometov, N.G. (1926). Materialy po mikoflore Srednei Azii. T. 1 [Materials on the mycoflora of Central Asia. Vol. 1]. AN UzSSR, Tashkent, 1–36 pp. (In Russ.).

Zaprometov, N.G. (1928). Materialy po mikoflore Srednei Azii. T. 2 [Materials on the mycoflora of Central Asia. Vol. 2]. AN UzSSR, Tashkent, 1–70 pp. (In Russ.).

Mr. Jatishwor Singh Irungbam, Biology Centre CAS, Branišovská, Czech Republic.
Dr. Ian J. Kitching, Natural History Museum, Cromwell Road, UK
Dr. George Mathew, Kerala Forest Research Institute, Peechi, India
Dr. John Noyes, Natural History Museum, London, UK
Dr. Albert G. Orr, Griffith University, Nathan, Australia
Dr. Sameer Padhye, Katholieke Universiteit Leuven, Belgium
Dr. Nancy van der Poorten, Toronto, Canada
Dr. Kareen Schnabel, NIWA, Wellington, New Zealand
Dr. R.M. Sharma, (Retd.) Scientist, Zoological Survey of India, Pune, India
Dr. Manju Siliwal, WILD, Coimbatore, Tamil Nadu, India
Dr. G.P. Sinha, Botanical Survey of India, Allahabad, India
Dr. K.A. Subramanian, Zoological Survey of India, New Alipore, Kolkata, India
Dr. P.M. Sureshan, Zoological Survey of India, Kozhikode, Kerala, India
Dr. R. Varatharajan, Manipur University, Imphal, Manipur, India
Dr. Eduard Vives, Museu de Ciències Naturals de Barcelona, Terrassa, Spain
Dr. James Young, Hong Kong Lepidopterists' Society, Hong Kong
Dr. R. Sundararaj, Institute of Wood Science & Technology, Bengaluru, India
Dr. M. Nithyanandan, Environmental Department, La Ala Al Kuwait Real Estate. Co. K.S.C., Kuwait
Dr. Himender Bharti, Punjabi University, Punjab, India
Mr. Purnendu Roy, London, UK
Dr. Saito Motoki, The Butterfly Society of Japan, Tokyo, Japan
Dr. Sanjay Sondhi, TITLI TRUST, Kalpavriksh, Dehradun, India
Dr. Nguyen Thi Phuong Lien, Vietnam Academy of Science and Technology, Hanoi, Vietnam
Dr. Nitin Kulkarni, Tropical Research Institute, Jabalpur, India
Dr. Robin Wen Jiang Ngiam, National Parks Board, Singapore
Dr. Lional Monod, Natural History Museum of Geneva, Genève, Switzerland.
Dr. Asheesh Shivam, Nehru Gram Bharti University, Allahabad, India
Dr. Rosana Moreira da Rocha, Universidade Federal do Paraná, Curitiba, Brasil
Dr. Kurt R. Arnold, North Dakota State University, Saxony, Germany
Dr. James M. Carpenter, American Museum of Natural History, New York, USA
Dr. David M. Claborn, Missouri State University, Springfield, USA
Dr. Kareen Schnabel, Marine Biologist, Wellington, New Zealand
Dr. Amazonas Chagas Júnior, Universidade Federal de Mato Grosso, Cuiabá, Brasil
Mr. Monsoon Jyoti Gogoi, Assam University, Silchar, Assam, India
Dr. Heo Chong Chin, Universiti Teknologi MARA (UiTM), Selangor, Malaysia
Dr. R.J. Shiel, University of Adelaide, SA 5005, Australia
Dr. Siddharth Kulkarni, The George Washington University, Washington, USA
Dr. Priyadarsanan Dharma Rajan, ATREE, Bengaluru, India
Dr. Phil Alderslade, CSIRO Marine And Atmospheric Research, Hobart, Australia
Dr. John E.N. Veron, Coral Reef Research, Townsville, Australia
Dr. Daniel Whitmore, State Museum of Natural History Stuttgart, Rosenstein, Germany.
Dr. Yu-Feng Hsu, National Taiwan Normal University, Taipei City, Taiwan
Dr. Keith V. Wolfe, Antioch, California, USA
Dr. Siddharth Kulkarni, The Hormiga Lab, The George Washington University, Washington, D.C., USA
Dr. Tomas Ditrich, Faculty of Education, University of South Bohemia in Ceske Budejovice, Czech Republic
Dr. Mihaly Foldvari, Natural History Museum, University of Oslo, Norway
Dr. V.P. Uniyal, Wildlife Institute of India, Dehradun, Uttarakhand 248001, India
Dr. John T.D. Caleb, Zoological Survey of India, Kolkata, West Bengal, India
Dr. Priyadarsanan Dharma Rajan, Ashoka Trust for Research in Ecology and the Environment (ATREE), Royal Enclave, Bangalore, Karnataka, India

Fishes

Dr. Neelesh Dahanukar, IISER, Pune, Maharashtra, India
Dr. Topiltzin Contreras MacBeath, Universidad Autónoma del estado de Morelos, México
Dr. Heok Hee Ng, National University of Singapore, Science Drive, Singapore
Dr. Rajeev Raghavan, St. Albert's College, Kochi, Kerala, India
Dr. Robert D. Sluka, Chiltern Gateway Project, A Rocha UK, Southall, Middlesex, UK
Dr. E. Vivekanandan, Central Marine Fisheries Research Institute, Chennai, India
Dr. Davor Zanella, University of Zagreb, Zagreb, Croatia
Dr. A. Biju Kumar, University of Kerala, Thiruvananthapuram, Kerala, India
Dr. Akhilesh K.V., ICAR-Central Marine Fisheries Research Institute, Mumbai Research Centre, Mumbai, Maharashtra, India
Dr. J.A. Johnson, Wildlife Institute of India, Dehradun, Uttarakhand, India
Dr. R. Ravinesh, Gujarat Institute of Desert Ecology, Gujarat, India

Amphibians

Dr. Sushil K. Dutta, Indian Institute of Science, Bengaluru, Karnataka, India
Dr. Annemarie Ohler, Muséum national d'Histoire naturelle, Paris, France

Reptiles

Dr. Gernot Vogel, Heidelberg, Germany
Dr. Raju Vyas, Vadodara, Gujarat, India
Dr. Pritpal S. Soorae, Environment Agency, Abu Dubai, UAE.
Prof. Dr. Wayne J. Fuller, Near East University, Mersin, Turkey
Prof. Chandrashekher U. Rivonker, Goa University, Taleigao Plateau, Goa. India
Dr. S.R. Ganesh, Chennai Snake Park, Chennai, Tamil Nadu, India
Dr. Himansu Sekhar Das, Terrestrial & Marine Biodiversity, Abu Dhabi, UAE

Birds

Dr. Hem Sagar Baral, Charles Sturt University, NSW Australia
Mr. H. Byju, Coimbatore, Tamil Nadu, India
Dr. Chris Bowden, Royal Society for the Protection of Birds, Sandy, UK
Dr. Priya Davidar, Pondicherry University, Kalapet, Puducherry, India
Dr. J.W. Duckworth, IUCN SSC, Bath, UK
Dr. Rajah Jayapal, SACON, Coimbatore, Tamil Nadu, India
Dr. Rajiv S. Kalsi, M.L.N. College, Yamuna Nagar, Haryana, India
Dr. V. Santharam, Rishi Valley Education Centre, Chittoor Dt., Andhra Pradesh, India
Dr. S. Balachandran, Bombay Natural History Society, Mumbai, India
Mr. J. Praveen, Bengaluru, India
Dr. C. Srinivasulu, Osmania University, Hyderabad, India
Dr. K.S. Gopi Sundar, International Crane Foundation, Baraboo, USA
Dr. Gombobaatar Sundev, Professor of Ornithology, Ulaanbaatar, Mongolia
Prof. Reuven Yosef, International Birding & Research Centre, Eilat, Israel
Dr. Taej Mundkur, Wetlands International, Wageningen, The Netherlands
Dr. Carol Inskipp, Bishop Auckland Co., Durham, UK
Dr. Tim Inskipp, Bishop Auckland Co., Durham, UK
Dr. V. Gokula, National College, Tiruchirappalli, Tamil Nadu, India
Dr. Arkady Lelej, Russian Academy of Sciences, Vladivostok, Russia
Dr. Simon Dowell, Science Director, Chester Zoo, UK
Dr. Mário Gabriel Santiago dos Santos, Universidade de Trás-os-Montes e Alto Douro, Quinta de Prados, Vila Real, Portugal
Dr. Grant Connette, Smithsonian Institution, Royal, VA, USA
Dr. P.A. Azeez, Coimbatore, Tamil Nadu, India

Mammals

Dr. Giovanni Amori, CNR - Institute of Ecosystem Studies, Rome, Italy
Dr. Anwaruddin Chowdhury, Guwahati, India
Dr. David Mallon, Zoological Society of London, UK
Dr. Shomita Mukherjee, SACON, Coimbatore, Tamil Nadu, India
Dr. Angie Appel, Wild Cat Network, Germany
Dr. P.O. Nameer, Kerala Agricultural University, Thrissur, Kerala, India
Dr. Ian Redmond, UNEP Convention on Migratory Species, Lansdown, UK
Dr. Heidi S. Riddle, Riddle's Elephant and Wildlife Sanctuary, Arkansas, USA
Dr. Karin Schwartz, George Mason University, Fairfax, Virginia.
Dr. Lala A.K. Singh, Bhubaneswar, Orissa, India
Dr. Mewa Singh, Mysore University, Mysore, India
Dr. Paul Racey, University of Exeter, Devon, UK
Dr. Honnavalli N. Kumara, SACON, Anaikatty P.O., Coimbatore, Tamil Nadu, India
Dr. Nishith Dharaiya, HNG University, Patan, Gujarat, India
Dr. Spartaco Gippoliti, Socio Onorario Società Italiana per la Storia della Fauna "Giuseppe Altobello", Rome, Italy
Dr. Justus Joshua, Green Future Foundation, Tiruchirapalli, Tamil Nadu, India
Dr. H. Raghuram, The American College, Madurai, Tamil Nadu, India
Dr. Paul Bates, Harison Institute, Kent, UK
Dr. Jim Sanderson, Small Wild Cat Conservation Foundation, Hartford, USA
Dr. Dan Challender, University of Kent, Canterbury, UK
Dr. David Mallon, Manchester Metropolitan University, Derbyshire, UK
Dr. Brian L. Cypher, California State University-Stanislaus, Bakersfield, CA
Dr. S.S. Talmale, Zoological Survey of India, Pune, Maharashtra, India
Prof. Karan Bahadur Shah, Budhanilakantha Municipality, Kathmandu, Nepal
Dr. Susan Cheyne, Borneo Nature Foundation International, Palangkaraja, Indonesia
Dr. Hemanta Kafley, Wildlife Sciences, Tarleton State University, Texas, USA

Other Disciplines

Dr. Aniruddha Belsare, Columbia MO 65203, USA (Veterinary)
Dr. Mandar S. Paingankar, University of Pune, Pune, Maharashtra, India (Molecular)
Dr. Jack Tordoff, Critical Ecosystem Partnership Fund, Arlington, USA (Communities)
Dr. Ulrike Streicher, University of Oregon, Eugene, USA (Veterinary)
Dr. Hari Balasubramanian, EcoAdvisors, Nova Scotia, Canada (Communities)
Dr. Rayanna Hellem Santos Bezerra, Universidade Federal de Sergipe, São Cristóvão, Brazil
Dr. Jamie R. Wood, Landcare Research, Canterbury, New Zealand
Dr. Wendy Collinson-Jonker, Endangered Wildlife Trust, Gauteng, South Africa
Dr. Rajeshkumar G. Jani, Anand Agricultural University, Anand, Gujarat, India
Dr. O.N. Tiwari, Senior Scientist, ICAR-Indian Agricultural Research Institute (IARI), New Delhi, India
Dr. L.D. Singla, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India
Dr. Rupika S. Rajakaruna, University of Peradeniya, Peradeniya, Sri Lanka
Dr. Bahar Baviskar, Wild-CER, Nagpur, Maharashtra 440013, India

Reviewers 2020–2022
Due to pausity of space, the list of reviewers for 2018–2020 is available online.

Journal of Threatened Taxa is indexed/abstracted in Bibliography of Systematic Mycology, Biological Abstracts, BIOSIS Previews, CAB Abstracts, EBSCO, Google Scholar, Index Copernicus, Index Fungorum, JournalSeek, National Academy of Agricultural Sciences, NewJour, OCLC WorldCat, SCOPUS, Stanford University Libraries, Virtual Library of Biology, Zoological Records.

NAAS rating (India) 5.64

The opinions expressed by the authors do not reflect the views of the Journal of Threatened Taxa, Wildlife Information Liaison Development Society, Zoo Outreach Organization, or any of the partners. The journal, the publisher, the host, and the partners are not responsible for the accuracy of the political boundaries shown in the maps by the authors.

Print copies of the Journal are available at cost. Write to:
The Managing Editor, JoTT,
c/o Wildlife Information Liaison Development Society,
43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore,
Tamil Nadu 641006, India
ravi@threatenedtaxa.org

www.threatenedtaxa.org

OPEN ACCESS

The Journal of Threatened Taxa (JoTT) 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 unless otherwise mentioned. JoTT allows allows unrestricted use, reproduction, and distribution of articles in any medium by providing adequate credit to the author(s) and the source of publication.

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

September 2023 | Vol. 15 | No. 9 | Pages: 23827–23930
Date of Publication: 26 September 2023 (Online & Print)
DOI: 10.11609/jott.2023.15.9.23837-23930

Article

Phylogenetic insights on the delineation of Mysore and Malabar subspecies of the Grey Slender Loris *Loris lydekkerianus* in southern India
– Vinay Teja, Shivakumara Manu, Honnavalli N. Kumara & Govindhaswamy Umapathy, Pp. 23827–23835

Communications

New localities and sexual dichromatism in Blue-green eyed Spotted Cuscus *Spilocuscus wilsoni* Helgen et Flannery, 2004 (Mammalia: Marsupialia: Phalangeridae) from Biak Island, Indonesia
– Aksamina Maria Yohanita, Kanthi Arum Widayati, Tri Atmowidi, Hiroo Imai & Bambang Suryobroto, Pp. 23836–23842

Nest construction and repairing habits of Baya Weaver *Ploceus philippinus* (Aves: Passeriformes: Ploceidae) in the agricultural landscape of Villupuram District, Tamil Nadu, India
– M. Pandian, Pp. 23843–23856

A checklist of the avifauna of Samanatham tank, Madurai, Tamil Nadu, India
– H. Byju, N. Raveendran, S. Ravichandran & Reshmi Vijayan, Pp. 23857–23869

Composition of avian communities in Ranjit Sagar Conservation Reserve, Punjab, India
– Onkar Singh Brraich, Sunil Kumar Saini & Jagdeep Singh, Pp. 23870–23878

Faunistic overview of the freshwater zooplankton from the urban riverine habitats of Pune, India
– Avinash Isaac Vanjare, Yugandhar Satish Shinde & Sameer Mukund Padhye, Pp. 23879–23888

Utilization of a new restoration technique for the rehabilitation of a degraded mangrove ecosystem: a case study from Koggala Lagoon, Sri Lanka
– Mahanama Gamage Greshan Dhanushka, Maduwe Guruge Manoj Prasanna, Kariyawasam Marthinna Gamage Gehan Jayasuriya & Indupa Hasindi Vitanage, Pp. 23889–23897

Diversity of powdery mildew fungi from protected areas of Jizzak region, Uzbekistan - a checklist
I.M. Mustafaev, I.Z. Ortiqov, K.K. Nuraliev & D.S. Khujaqulova, Pp. 23898–23910

Notes

A case report on chronic renal disease in a captive wild Leopard *Panthera pardus* (Mammalia: Carnivora)
– Abhishek Verma, Rakesh Kumar, Smriti Jamwal, Ankita, Rajendra Damu Patil & Rajesh Kumar Asrani, Pp. 23911–23913

The first photographic evidence of Ruddy Mongoose *Herpestes smithii* Gray, 1837 (Mammalia: Carnivora: Herpestidae) in Katerniaghat Wildlife Sanctuary, Uttar Pradesh, India
– Javed Anver, Vipul Maurya & Sanjay Kumar Pathak, Pp. 23914–23916

New locality record of the Asiatic Long-tailed Climbing Mouse *Vandeleuria oleracea* (Bennett, 1832) (Mammalia: Rodentia: Muridae) from Kohora River Basin, Assam, India
– Sourav Gupta, Ramie H. Begum, Jayanta Kumar Roy, M. Firoz Ahmed & Shyamkant S. Talmale, Pp. 23917–23919

New distribution record of fish *Clupisoma garua* (Hamilton, 1822) (Siluriformes: Ailiidae) from the Sarpang District in southern central part of Bhutan
– Sangay Dorji & Jigme Tenzin, Pp. 23920–23924

Kukumseri: a home to *Colchicum luteum* Baker (Colchicaceae), a rare and endangered medicinal herb
– Rajender Kumar Sharma, Pp. 23925–23927

First record of the Western Himalayan Yew *Taxus contorta* (Gymnosperms: Cupressales: Taxaceae) from Lumbini Province, Nepal
– Santa Bahadur Thing, Deepak Raj Prakash Janga Shahi & Shashi Shrestha, Pp. 23928–23930

Publisher & Host

Threatened Taxa