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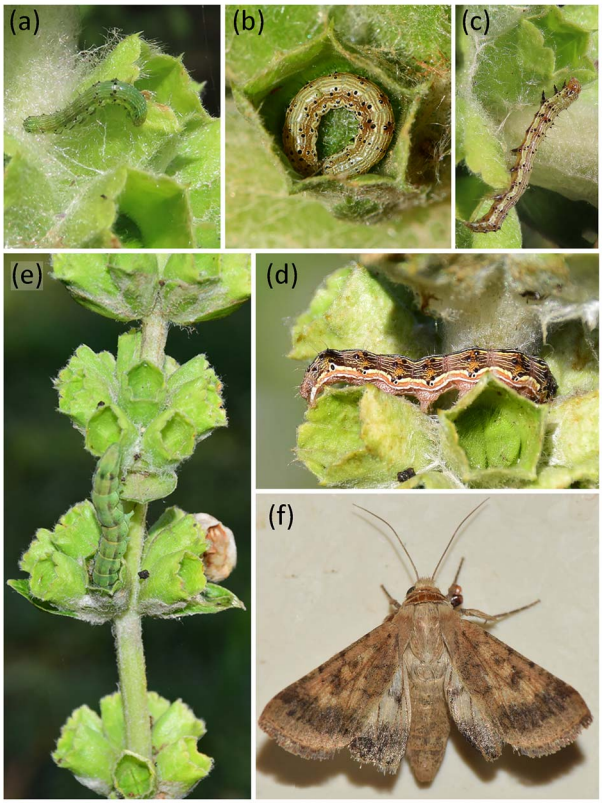
The moth *Helicoverpa armigera* is a leading cause of the decline of the Endangered golden Himalayan spike *Phlomoides superba*

The impacts of invasive invertebrates on plants are primarily studied on cultivated crops, with the effects on wild and threatened species mostly overlooked. The genus *Phlomoides* (Lamiaceae; common names include Jerusalem sage and Lampwick plant) comprises 174 species primarily occurring in Asia and some parts of Europe. The golden Himalayan spike *Phlomoides superba* (syn. *Eremostachys superba*) is an Endangered species (Srivastava et al., 2017, *Journal of Threatened Taxa*, 9, 10089–10095) endemic to the western Himalayan foothills of eastern Afghanistan, Pakistan and India, at altitudes of 450–800 m. There are concerns regarding its decline in natural habitats in several locations. The reasons are still poorly understood but low regeneration potential is one possible cause. In 2020, the species disappeared from its type locality in Mohand Pass, Dehradun, India.



Helicoverpa armigera infestation on *Phlomoides superba*: (a–d) 3rd–6th instar larval stage feeding on seed capsules, (e) final instar and emptied seed capsules, (f) female adult moth. Photos: Amber Srivstava.

In May 2023, we discovered that the major cause of the decline of *P. superba* appears to be infestation by an insect pest whose larvae feed on its seeds, leading to seed loss and thus affecting regeneration. In April 2024, we collected 20 larvae from three populations of *P. superba* in Jammu, India, and from plants growing in the garden of the Botanical Survey of India, Dehradun. We kept the larvae in transparent glass bottles for 25–32 days until pupation and emergence of the adult, which was then identified as the cotton bollworm *Helicoverpa armigera* (Lepidoptera: Noctuidae), a polyphagous, invasive moth globally recognized as a pest of c. 200 crops. From 1st to 3rd instar stage the larvae mainly feed on the tender leaves and then migrate to the seed capsules; we observed 90–95% seed loss in highly infested populations. Major infestations were found on *P. superba* near crop fields or human settlements. In ex situ conservation conditions, *P. superba* is growing well and regenerating at the Botanical Survey of India, Dehradun, where regular pesticide treatment controls the infestation, resulting in 95% seed survival and 84% seed germination.

The shift of crop pests to wild, threatened species needs to be monitored as many native and endemic species do not have natural defences against attacks by invasive pests. This discovery of the impact of *H. armigera* on a threatened wild plant species will be of help in development of a conservation protocol to address the ongoing decline of *P. superba*.

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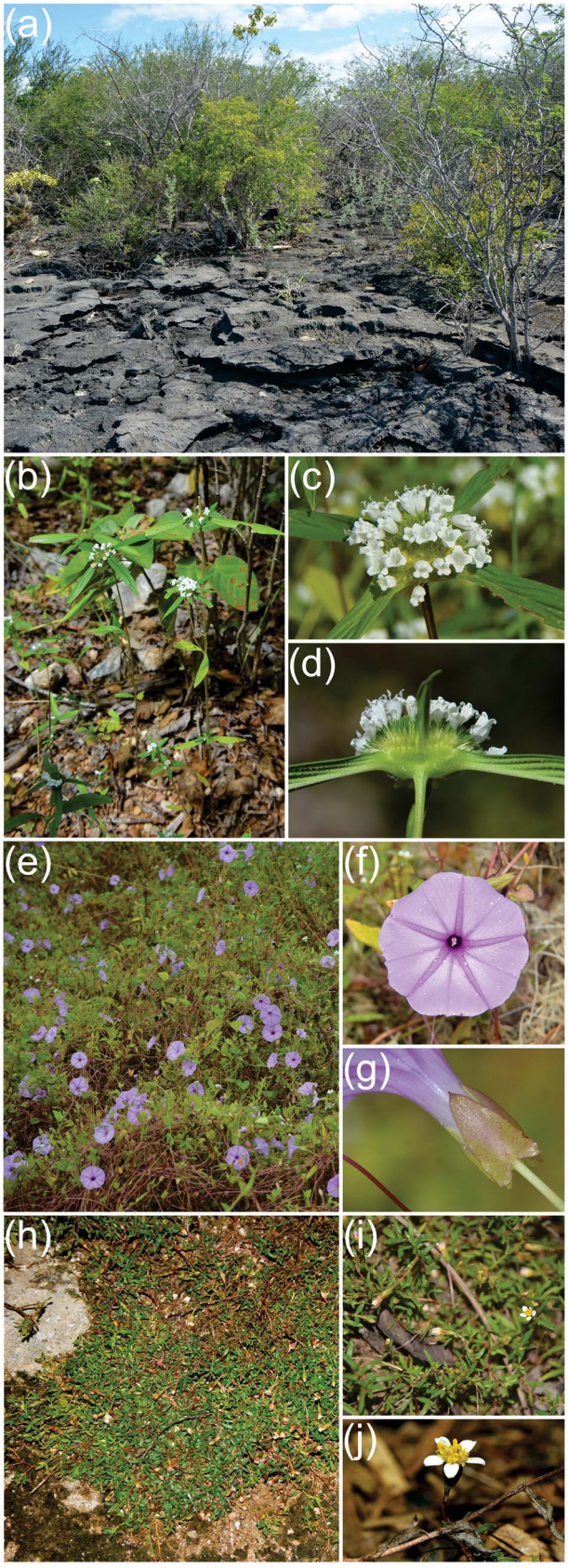
New subpopulations of three threatened plant species endemic to the karstic areas of the Potiguar Basin, Brazil

The flora of the karstic areas discontinuously exposed in the Potiguar Basin in north-east Brazil is poorly studied. However, three annual herbaceous flowering plant species have recently been described as endemic to these areas: *Borreria apodiensis* (Souza et al., 2016, *Acta Botanica Brasilica*, 30, 283–289), *Ipomoea apodiensis* (Wood et al., 2020, *PhytoKeys*, 143, 1–823) and *Pectis loiolae* (Rebouças et al., 2021, *Systematic Botany*, 46, 486–492), known from five, two and one locations, respectively. *Ipomoea apodiensis* is categorized as Endangered on the IUCN Red List, and recommendations have been made to categorize *B. apodiensis* and *P. loiolae* as Endangered and Data Deficient, respectively.

During February–July 2024, as part of project no. PIA10010-2022, we surveyed for new subpopulations of



(a) Limestone outcrop in the municipality of Felipe Guerra, Rio Grande do Norte, where we recorded (b-d) *Borreria apodiensis*, (e-g) *Ipomoea apodiensis* and (h-j) *Pectis loiolae*. Photos: E.C.O. Chagas.

these species. We discovered three additional locations, on limestone outcrops of 220–8,500 ha, of *B. apodiensis* and *I. apodiensis*, and two of *P. loiolae*, which was previously known only from the type locality, increasing the extent of occurrence (EOO) and area of occupancy (AOO) of all three species. We recorded *B. apodiensis* and *I. apodiensis* near the municipality of Jandaíra (in Rio Grande do Norte), c. 200 km from their previously known range in the Chapada do Apodi. The two new locations of *P. loiolae* were in the Chapada do Apodi. We also examined herbarium specimens from the local MOSS herbarium in Rio Grande do Norte, expanding our knowledge of the species' distributions and providing new insights into flowering and fruiting periods.

Based on their increased EOO, both *B. apodiensis* and *I. apodiensis* could be recategorized as Vulnerable, but their discontinuous distribution along the limestone outcrops justifies their Endangered status, as is the case for the rare *P. loiolae*. All three species could face declines in EOO, AOO and habitat quality, primarily because of rock extraction for paving, gypsum production, and the installation of wind and solar power plants. The Parque Nacional da Furna Feia, the only legally protected area containing limestone outcrops in the Potiguar Basin, is crucial for conserving these species.

Currently, the team at the Laboratório de Sistemática e Evolução de Plantas, Universidade Federal Rural do Semi-Árido, is using species distribution models to identify potential new areas of occurrence. We are also establishing a germplasm bank for ex situ conservation and studying germination and vegetative propagation to support future species restoration. We plan to collaborate with managers of protected areas and private reserves to promote these species as umbrella or flagship species for conservation.

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Tibetan brown bear recorded in Changthang, Ladakh, India

Four species of bear occur in India: the Himalayan brown bear *Ursus arctos isabellinus* and Asiatic black bear *Ursus thibetanus* in the Himalayan mountain ranges, and the sloth bear *Melursus ursinus* and sun bear *Helarctos malayanus* in the tropical forest areas of the north-eastern hill states and in peninsular India. All four species are categorized as threatened on the IUCN Red List because of increasing threats throughout their range, including habitat