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Cover: Orange Oakleaf *Kallima inachus* with colour pencils and watercolor wash by Elakshi Mahika Molur adapted from a workshop by Lenin Raj.

to 2023) in and around Aizawl District, Mizoram, four naturalized plant species in the state could be identified and reported as new addition to state flora. The specimens of these four taxa were collected during their flowering period from different localities of Aizawl District. The characters and measurements of the plants were done and after critical examination of characters, perusal of literatures, and consultation of online herbarium (POWO 2023; Tropicos 2023; WFO 2023), the plants were identified. All the collected plants were processed for herbarium preparation following Jain & Rao (1977) and the herbarium vouchers were deposited in Mizoram University Herbarium (MZUH), Department of Botany.

RESULTS

Taxonomic Treatment

Achimenes longiflora DC. Prodr. 7: 536 (1839) [Gesneriaceae] (Image 1A & B)

Herbaceous, up to 70 cm tall, brown to maroon stem, pubescent. Leaves arranged in whorl, green upper surface and maroon lower surface, pubescent, margin serrate. Petiole 1.3–1.7 cm long, pubescent, green. Peduncle absent. Pedicel 1.5 cm long, densely pubescent, maroon. Calyx 1.8 × 0.2 cm long, divided up to base, lanceolate, pubescent, re-curved at tip. Inflorescence 2–4 flowered, axillary. Corolla 4.8 cm long, tube glabrous, yellow to maroon, 5 lobes, purple, inner corolla having dark brown patches. Stamen 4, glabrous, 2 cm long, anther inserted, all 4 anthers fused at one point. Staminode white, one in number, 0.1 cm long. Pistil 2.8 cm long, stigma densely pubescent, bilobed white, 0.1 cm long, style densely pubescent.

Common name: Cupid's Bow

Vernacular name: Not found

Flowering & Fruiting: July–November

Mode of Propagation: Rhizomes and seeds

Habitat & ecology: Adapted to a tropical climate, with high humidity and consistent temperatures throughout the year. In cultivation, it can be grown in a range of temperatures, but it prefers warm, humid conditions and will not tolerate frost.

Native range: Tropical regions of Mexico and Central America

Distribution: India (Meghalaya & Sikkim), Central America, Caribbean.

Economic Importance: The plant is commonly cultivated as ornamental plant in the botanical gardens, ecotourism sites, parks and landscapes. It has huge potential for development into new cultivars by

horticulturists for their commercialization and providing economic values to growers and florists.

Species examined: India, Mizoram, Aizawl District, Lungleng, 23.6656°N 92.6635°E, 980 m elevation, 07 November 2022, Lal Tlanhlui & Margaret Lalhlupuii, 129815 (MZUH).

Notes: The plant is introduced into various parts of the world due to its beautiful flowers and become naturalized in the non-native habitats. The vigorous growth and the ability for prolific reproduction through seeds and vegetative means can outcompete the native plants affecting the natural flora and fauna by affecting even the pollinators.

Chrysothemis pulchella (Donn ex Sims) Decne., Rev. Hort. (Paris) sér. 3, 3: 242 (1849) [Gesneriaceae] (Image 1C & D)

Perennial, 20–80 cm long, stem sparsely pubescent, succulent, green. Leaves opposite decussate, 11–24 × 4.6–11.2 cm long, pubescent on upper surface but glabrous on lower surface, margin serrate, base oblique, secondary venation 6–9, rough. Petiole 0.5–3 cm long, succulent, green. Bract pubescent. Pedicel 1 cm long, pubescent. Calyx 5, brick red, teeth pubescent, serrate. Inflorescence corolla 2.5 cm long, pubescent at lower tube, yellow, 5 lobes, inner lobe having maroon streaks. Stamen 4, glabrous, filament coil at the upper end. Pistil glabrous, 1.5 cm long, ovary 0.3 cm long.

Common name: Sunset Bells /Yellow Mellow

Vernacular name: Not found

Flowering & Fruiting: July–October

Mode of Propagation: Seeds

Habitat & Ecology: The plant is often cultivated for ornamental and decorative uses. It is also commonly found to be naturalized in proximity to gardens, alongside roads and near houses as an escapee.

Native Range: Mexico to Tropical America

Distribution: India (Kerala, Manipur); Central America and South America (Introduced in various parts of countries as ornamental plant).

Economic Importance: It is commonly cultivated as ornamental plant in gardens, landscapes as well as their use in cut flower industry. When the plant becomes naturalized in a new environment, it can become invasive and have negative impacts to the native biodiversity.

Species examined: India, Mizoram, Aizawl District, Mizoram University, 23.7386°N, 92.6701°E, 890 m elevation, 23 September 2021, Lal Tlanhlui & Margaret Lalhlupuii, 129812 (MZUH).

Notes: The plant is generally introduced for its ornamental purposes. However, its aggressive growth

can have adverse effects to the non-native environment.

Cuscuta campestris Yunck. Mem. Torrey Bot. Club 18: 138 (1932) [Convolvulaceae] (Image 1E, F & G)

Vine, annual (perennial herb if on perennial host), rootless, obligate stem parasitic climber with filiform stems attached to the host by numerous haustoria, leafless. Stem cylindrical, solid, thread like less than 1 mm in diameter, abundantly branched twinning, glabrous. Along the stem, groups of 5–15 suckers (haustoria) are regularly found aligned. Inflorescence consists of dense glomerules, evenly spaced along the stems, comprising of many flowers, 0.7 cm long. Flowers 0.4 cm long, white or yellowish white, pedicel 0.4–0.5 cm long. Calyx consists of 5 ovate sepals, 0.1 cm long, fused at base with rounded lobes, corolla is campanulate (bell shaped) 0.2 cm long, lobes 5 nos., sharp, persistent, tube is same length as lobe. Stamens 5, ovary glabrous, 0.1 cm in diameter, style bifid, stigma globular.

Common name: Field dodder; golden dodder; yellow dodder

Vernacular name: 'Japanhlo ral'

Flowering & Fruiting: September–December

Mode of Propagation: Seeds and stem fragments

Habitat & Ecology: Found as a parasite to many herbaceous plants like *Acmella ciliata* (Kunth) Cass., *Polytoca wallichiana* (Nees ex Steud.) Benth. and very commonly with the invasive alien plant species (IAPS) *Mikania micrantha* Kunth with even the vernacular name Japanhlo ral means enemy to this plant (Image 1F). Locally abundant in moist open grassland along streams associated with *Clinopodium umbrosum* (M. Bieb.) Kuntze, *Chlorophytum nepalense* (Lindl.) Baker, *Oplismenus compositus* (L.) P. Beauv., *Pedicularis gracilis* Wall. ex Benth. etc.

Native Range: North America, Caribbean, and western South America.

Distribution: India (Andhra Pradesh, Gujarat, Jammu & Kashmir, Madhya Pradesh, Orissa, Tamil Nadu, Uttar Pradesh, Assam, Meghalaya); Africa, Asia, Australia, Europe, North America, Pacific Island, South America.

Economic Importance: *Cuscuta* spp. including *C. campestris* have become a serious issue for many agricultural crops and other economically important plants that lead to great reduction in their yield. However, *C. campestris* was reported to be an effective biocontrol agent against another invasive alien plant species (IAPS) *Mikania micrantha* (Yu et al. 2008), which is also commonly seen as a host plant in the present study.

Specimens examined: India, Mizoram, Aizawl

District, Mizoram University, 23.7386°N, 92.6722°E, 888 m elevation, 18 October 2022, Lal Tlanhlui & Margaret Lalhlupuii, 129811(MZUH).

Notes: Although commonly distributed in different parts of Mizoram, the plant is generally misidentified as *Cuscuta reflexa* Roxb. which is already reported from the state. The present report is important for various ecosystems and conservation efforts for the native plants as the plant is under obnoxious IAPS affecting the native plant diversity.

Stylosanthes guianensis (Aubl.) Sw., Kongl. Vetensk. Acad. Handl. 1789: 296 (1789) [Fabaceae] (Image 1G & H)

Herb, spreading shrub, up to 100 cm tall, invasive weed; stem green, pubescent, round; leaf 3 foliate, leaf margin entire, pubescent, pinnate, leaflets sub-sessile, stipules sheathing, inflorescence 2–4 flowered, bract pubescent primary bracts 0.9–2.1 cm long, the outer densely covered with mostly spreading long bristles; secondary bracts 2–5 mm long, 0.7 mm wide; bracteole 1.9–4 mm long, lanceolate, green, calyx pale green, lobes elliptic or oblong, glabrous, corolla yellow, 3–5 mm, vexillum with maroon streaks, keel yellow. Pods ovoid, glabrous, brown, 2 × 1.4 mm, one article, beak 0.4 mm, inflexed, the article ovoid, 2–3 mm long, 1.8 mm wide, glabrous or minutely short pubescent near the apex; beak minute, 0.1–0.4 mm long, inflexed. Seeds pale brown, glabrous compressed-ellipsoid, beaked or pointed near the hilum, shiny.

Common name: Stylo

Vernacular name: Not found

Flowering & Fruiting: September – December

Mode of Propagation: Seeds

Habitat & Ecology: Commonly seen growing along roadsides and open grasslands.

Native Range: Mexico to southern Tropical America

Distribution: India (Kerala, Manipur); Taiwan, China, North America, Central America, South America.

Economic Importance: Tropical perennial forage crop with high forage yield.

Specimens examined: India, Mizoram, Aizawl District, Mizoram University, 23.7375°N, 92.6622°E, 854 m elevation, 18 December 2022, Lal Tlanhlui & Margaret Lalhlupuii, 129801(MZUH).

Notes: The plant is commonly introduced to different parts of the world as an important forage and fodder legume and found naturalized in many tropical regions.

DISCUSSION AND CONCLUSION

The four naturalized alien plant species *Achimenes*

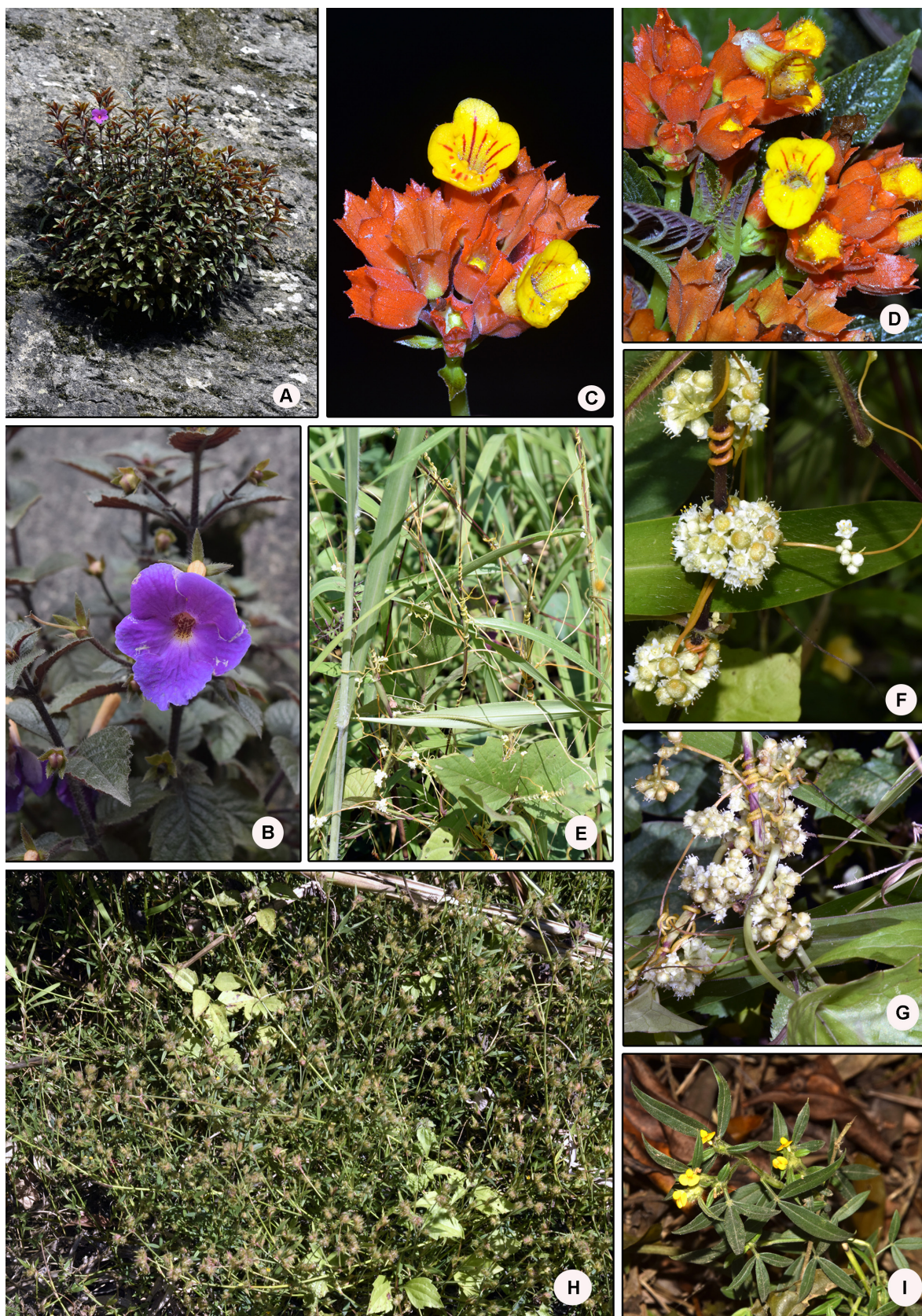


Image 1. A & B—*Achimenes longiflora* (A—habit | B—close up) | C & D—*Chrysothemis pulchella* (close up). E, F & G—*Cuscuta campestris*: E—Habit | F—Close up on the host plant | G—Close up on host *Mikania micrantha*. H & I—*Stylosanthes guianensis*: H—Habit | I—Close up. © Lal Tlanhlui & Margaret Lalhlupuii.

longiflora, *Chrysothemis pulchella*, *Cuscuta campestris* and *Stylosanthes guianensis* with the first two taxa belong to Gesneriaceae and the other two from Convolvulaceae and Fabaceae family respectively are reporting for first time from Mizoram, northeastern India. Except for *Cuscuta campestris*, the other three taxa represent the first generic new record from the state. Also, *C. campestris* is a well-known IAPS which are obligate stem parasite and agricultural pest creating huge economic losses due to its ability to infest wide range of host plants from economically important cultivated plants (Baráth 2021). The two taxa *Achimenes longiflora* and *Chrysothemis pulchella* are generally introduced as ornamental plants which later on become naturalized to the new place and this introduction for horticultural purpose is an important parameter for naturalization and invasion process necessary for becoming IAPS (Rojas-Sandoval & Acevedo-Rodríguez 2015). Many species of *Stylosanthes* including *Stylosanthes guianensis* have been introduced to different parts of India as a forage and fodder legume (Chandra et al. 2006). However, *Stylosanthes* species in particular *S. guianensis* have been identified from Australia as a conservation threat due to their aggressive nature and ability to invade areas beyond pastures (Maass & Sawkins 2004). As Mizoram being a part of Indo-Burma hotspot, which is recognized as one of the most important biodiversity hotspot, early identification and detection of these alien naturalized plants in the state will be crucial to prevent the establishment and their spread to the native ecosystem and for promoting sustainable biodiversity conservation.

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Articles

Echolocation call characterization of insectivorous bats from caves and karst areas in southern Luzon Island, Philippines

– Renz Angelo Duco, Anna Pauline de Guia, Judeline Dimalibot, Phillip Alviola & Juan Carlos Gonzalez, Pp. 23931–23951

Seasonality, diversity, and forest type associations of macro moths (Insecta: Lepidoptera: Heterocera) in the Shiwalik landscape of northern India and its conservation implications

– Arun Pratap Singh & Lekhendra, Pp. 23952–23976

Vertebrate assemblages on fruiting figs in the Indian eastern Himalaya's Pakke Wildlife Sanctuary

– Akangkshya Priya Gogoi, Janmejay Sethy, Awadhesh Kumar, Dipika Parbo, Murali Krishna Chatakonda & Ajay Maletha, Pp. 23977–23989

Communications

From the Arabian Peninsula to Indian shores: Crab Plover *Dromas ardeola* Paykull, 1805 (Aves: Charadriiformes: Dromadidae) breeding at Point Calimere, India

– H. Byju, N. Raveendran & K.M. Aarif, Pp. 23990–23995

Assessing avian diversity and conservation status in Dighal Wetlands, Haryana, India

– Parul & Parmesh Kumar, Pp. 23996–24008

Studies on the response of House Sparrow *Passer domesticus* to artificial nest-boxes in rural Arakkonam and Nemili taluks, Vellore District, Tamil Nadu, India

– M. Pandian, Pp. 24009–24015

Threat assessment and conservation challenges for the herpetofaunal diversity of Dampa Tiger Reserve, Mizoram, India

– Sushanto Gouda, Ht. Decemson, Zoramkhuma, Fanai Malsawmdawngliana, Lal Biakzuala & Hmar Tlawmte Lalremsanga, Pp. 24016–24031

Taxonomy and conservation status of swamp eels (Synbranchiformes: Synbranchidae) of West Bengal, India

– Ram Krishna Das, Pp. 24032–24042

Sacred river of Pune: boon or bane for the diversity of aquatic beetles (Insecta: Coleoptera)

– Rita Deb, Pallavi Takawane & K.A. Subramanian, Pp. 24043–24053

Fine structure of sensilla on the proboscis of the Indian Honey Bee *Apis cerana indica* Fabricius (Insecta: Hymenoptera: Apidae)

– A.G. Suhas Krishna, Shamprasad Varija Raghu & Rajashekhar K. Patil, Pp. 24054–24062

A compendium of *Aphelenchoides* (Fischer, 1894) (Nematoda: Tylenchina: Aphelenchoidea) nematodes with the description of a new species from Manipur, India

– Loukrakpam Bina Chanu & Naorem Mohilal, Pp. 24063–24078

Efficacy of levamisole and oxclozanide treatment on gastrointestinal nematodes of ungulates at the Central Zoo, Nepal

– Pratik Kiju, Amir Sadaula, Parbat Jung Thapa & Chiranjibi Prasad Pokheral, Pp. 24079–24085

Ocimum gratissimum L. ssp. *gratissimum* var. *macrophyllum* Briq. (Lamiaceae: Nepetoideae: Ocimeae) a new record from northeastern India

– Mamita Kalita, Nilakshee Devi & Diganta Narzary, Pp. 24086–24091

The study of biogeographic patterns of the genus *Parmotrema* in Wayanad District, Kerala with a new record in India

– Bibin Joseph, Edathum Thazhekuni Sinisha, Valiya Thodiyil Jaseela, Harshid Pulpambil & Nediyaarambu Sukumaran Pradeep, Pp. 24092–24103

Review

Diversity of Calliphoridae and Polleniidae (Diptera) in the Himalaya, India

– Meenakshi Bharti, Pp. 24104–24115

Short Communications

First photographic evidence of mangle manifestation in Panna Tiger Reserve, India

– Supratim Dutta & Krishnamurthy Ramesh, Pp. 24116–24119

New locality record of Forest Spotted Gecko *Cyrtodactylus* (*Geckoella*) cf. *speciosus* (Beddome, 1870) (Reptilia: Squamata: Gekkonidae) from Thanjavur, in the eastern coastal plains of Tamil Nadu, India

– Gopal Murali, Pp. 24120–24124

Preliminary observations of moth (Lepidoptera) fauna of Purna Wildlife Sanctuary, Gujarat, India

– Preeti Choudhary & Indu Sharma, Pp. 24125–24130

On the occurrence of *Audouinella chalybea* (Roth) Bory, 1823, a rare freshwater red algae (Florideophyceae: Acrochaetiales: Audouinellaceae) from eastern Himalaya, India

– Jai Prakash Keshri & Jay Mal, Pp. 24131–24134

Addition of four invasive alien plant species to state flora of Mizoram, India

– Lal Tlanhlu, Margaret Lalhlupui, Sanatombi Devi Yumkham & Sandhyarani Devi Khomdram, Pp. 24135–24139

Notes

First sighting record of Western Reef-Heron *Egretta gularis* (Bosc, 1792) (Aves: Pelecaniformes: Ardeidae) from Jammu & Kashmir, India

– Parvaiz Yousuf, Semran Parvaiz, Nisheet Zehbi, Sabia Altaf, Showkat Maqbool, & Mudasir Mehmood Malik, Pp. 24140–24143

Rare desmid genus *Bourrellyodesmus* Compère (Chlorophyceae: Desmidiaceae) in India with description of a new species (*Bourrellyodesmus indicus* Das & Keshri sp. nov.) from eastern Himalaya, India

– Debjyoti Das & Jai Prakash Keshri, Pp. 24144–24147

Threats faced by *Humboldtia bourdillonii* Prain (Magnoliopsida: Fabales: Fabaceae), an endangered tree endemic to the southern Western Ghats, India

– Jithu K. Jose & K. Anuraj, Pp. 24148–24150

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