

GENOME SEQUENCING

The complete genome sequences of 38 species of Iridaceae (Asparagales, Magnoliopsida)

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Biodiversity Genomes

We present complete genome sequences of 38 species of plants in the Iridaceae focused on *Tigridia* Juss. and closely related genera.

Introduction

The Mexican Tiger Irises (genus *Tigridia* Juss.) are monocots endemic to Mexico that have diversified along the Mexican Transition Zone, a key geographic region of overlap between the Nearctic and Neotropical biotas. *Tigridia* exhibits striking diversity in floral color, patterning, and morphology that results in the attraction of a wide array of pollinators including hummingbirds, bees, and flies. These floral features also contribute to many *Tigridia* species being highly coveted in the ornamental trade. Phylogenetic relationships within *Tigridia* and among its sister lineages are contentious, obfuscating our understanding of the evolutionary history of this charismatic group of monocots. Here we present 38 high-quality genomes for *Tigridia* and closely related taxa ([Figure 1](#)), including species currently placed in the genera *Ainea*, *Alophia*, *Cardiostigma*, *Cipura*, *Cobana*, *Colima*, *Eleutherine*, *Herbertia*, *Larentia*, *Nemastylis*, and *Sessilanthra*; with *Trimezia* selected as an outgroup for evolutionary analyses. These resources will establish a foundation for future phylogenomic and comparative studies to explore the evolution of floral traits within the group, ultimately contributing to our understanding the diversification and endemism of flora that inhabit the Mexican Transition Zone.



Figure 1. Species of Iridaceae.

a. *Alophia drummondii* (Graham) R.C. Foster (*Munguía-Lino et al. 1105*, Road to Pinoltepec, Emiliano Zapata, Veracruz, Mexico); b. *Alophia intermedia* (Ravenna) Goldblatt (*Rodríguez & Castro 5788*, Tepic, Nayarit, Mexico); c. *Alophia silvestris* (Loes.) Goldblatt (*Munguía-Lino et al. 1290*, Balancán, Tabasco, Mexico); d. *Alophia veracruzana* Goldblatt & T.M.Howard (*Munguía-Lino et al. 1113*, La Tunilla, Alvarado, Veracruz, Mexico); e. *Cipura campanulata* Ravenna (*Munguía-Lino et al. 29*, Corralejo, Taxco de Alarcón, Guerrero, Mexico); f. *Cobana guatemalensis* (Standl.) Ravenna (*Rodríguez et al. 8518*, Cobán, Alta Verapaz, Guatemala); g. *Eleutherine latifolia* (Standl. & L.O.Williams) Ravenna (*Rodríguez & L. Ortiz-Catedral 3167*, Cerro de las Animas, Catemaco, Veracruz, México); h. *Herbertia lahue* (Molina)Goldblatt (*Munguía-Lino et al. 365*, Lavras do Soul, Río Grande Do Soul, Brazil); i. *Larentia mexicana* (C.V.Morton & R.C.Foster) Goldblatt (*Rodríguez & Munguía-Lino 7453*, Cerro Colorado, La Huerta, Jalisco, Mexico); j. *Cypella rosei* R.C.Foster (*Rodríguez et al. 8444*, Compostela, Nayarit, Mexico); k. *Nemastylis tenuis* (Baker) Benth. & Hook.f. ex S.Watson

(*Munguía-Lino et al. 702*, El Cuarenta, Tlajomulco de Zuñiga, Jalisco, Mexico); l. *Tigridia bicolor* Molseed (*Rodríguez et al. 2845*, San Cristóbal Suchixtlahuaca, Oaxaca, Mexico); m. *Tigridia coerulea* Goldblatt (*Munguía-Lino et al. 1080*, La Campana, Atenguillo, Jalisco, Mexico); n. *Tigridia convoluta* (Ravenna) Goldblatt (*Rodríguez et al. 6314*, road to Tecmán, Colima, Mexico); o. *Tigridia conzattii* (R.C.Foster) Goldblatt (*Rodríguez & Ortiz-Catedral 2948*, Santiago Tenango, Oaxaca, Mexico); p. *Tigridia dugesii* S.Watson (*Munguía-Lino et al. 637*, Pinal de la Venta, Zapopan, Jalisco, Mexico); q. *Tigridia durangensis* Molseed ex Cruden (*Noriega & González-Gallegos 610*, Quebrada de Santa Bárbara, Pueblo Nuevo, Durango, Mexico); r. *Tigridia ebrenbergii* (Schltdl.) Molseed (*Rodríguez et al. 6236*, San Pedro Guadalupe, Zumpahuacán, Estado de México, Mexico); s. *Tigridia flammea* (Lindl.) Ravenna (*Rodríguez & Christian Briseño 4172*, El Salto del Agua, Morelia, Michoacán, Mexico); t. *Tigridia fosteri* Goldblatt (*Rodríguez et al. 5154*, heading to Tumbisca, Morelia, Michoacán, Mexico); u. *Sessilanthra beliantha* (Ravenna) Cruden (*Rodríguez & Christian Briseño 3974*, Palo Blanco, Guerrero, Mexico); w. *Tigridia latifolia* (Weath.) Goldblatt (*Munguía-Lino & Rodríguez 283*, Iguala-Cuernavaca free highway, Taxco de Alarcón, Guerrero, Mexico); x. *Tigridia longispatha* (Herb.) Goldblatt (*Munguía-Lino & López-Pérez 1283*, Parque Nacional los Azufres, Ciudad Hidalgo, Michoacán, Mexico); y. *Tigridia mariaetrinitatis* Espejo & López-Ferr (*Munguía-Lino & López-Pérez 1052*, Chalcatongo de Hidalgo, Oaxaca, Mexico); z. *Tigridia meleagris* G.Nicholson (*Munguía-Lino & López-Pérez 858*, Trejos, Ixtlahuacán del Río, Jalisco, Mexico); a'. *Tigridia mexicana* Molseed (*Munguía-Lino & López-Pérez 858*, El Durazno, Valle de Bravo, Estado de México, Mexico); b'. *Tigridia mortonii* Molseed (*Munguía-Lino & Vázquez-García 188*, Sierra de Nanchititla, Luvianos, Estado de México, Mexico); c'. *Tigridia multiflora* (Herb.) Ravenna (*Munguía-Lino & López-Pérez 1414*, Cerro el Tajo, Zapopan, Jalisco, Mexico); d'. *Tigridia oaxacana* (Molseed) Goldblatt (*Munguía-Lino & López-Pérez 1375*, Ixpantepec Nieves, Oaxaca, Mexico); e'. *Tigridia orthantha* (Lem.) Ravenna (*López-Pérez 204*, Llano de las flores, San Juan Atepec, Oaxaca, Mexico); f. *Tigridia pavonia* (L.f.) Redouté (*Munguía-Lino et al. 245*, San Sebastián de las Grutas, Oaxaca, Mexico); g'. *Tigridia potosina* López-Ferr. & Espejo (*Munguía-Lino et al. 1233*, Llano de la Garza, Xilitla, San Luis Potosí, Mexico); h'. *Tigridia pugana* Aarón Rodr. & Ortiz-Cat (*Munguía-Lino et al. 1079*, Puerto La Campana, Atenguillo, Jalisco, Mexico); i'. *Tigridia purpusii* Molseed (*Rodríguez et al. 5154*, in front of African Safari zoo, Puebla, Mexico); j'. *Tigridia tepoxtlana* Ravenna (*Rodríguez et al. 5203*, San Juan Tlacotenco, Tepoztlán, Morelos, Mexico); k'. *Tigridia tuitensis* (Aarón Rodr. & Ortiz-Cat.) Goldblatt (*Ramírez-Delgadillo & Rodríguez 2961*, Cabo corrientes, Jalisco, Mexico); l'. *Trimezia candida* (Hassl.) Ravenna (Rio Grande do Sul, Brazil). Photos of A. Rodríguez (b, g, n, s, t, u, i', j', k'), G. Munguía (e, h, o, g, c', d', f, l'), J. González (q), J. López (a, c, d, f, k, l, m, p, r, w, t, y, z, a', e', h'), and P. Rivas (i, g').

Methods

DNA was extracted from leaves that were collected from living material and subsequently dried and stored in silica, with approximately 10-15 mg of leaf tissue used per extraction. Voucher specimens for each species are indicated in [Table 1](#); most vouchers were deposited in the herbarium of the Instituto de Botánica of the Universidad de Guadalajara (IBUG) with *Trimezia candida* collected from the Liberty Hyde Bailey Conservatory at Cornell and deposited in the L. H. Bailey Hortorium Herbarium (BH). Each DNA extraction was performed using the Qiagen DNEasy genomic extraction kit using the manufacturer's protocol. Paired-end sequencing libraries were constructed using the Illumina TruSeq kit according to the manufacturer's instructions. Libraries were sequenced on an Illumina Hi-Seq platform in paired-end, 2 × 150 bp format. The resulting fastq files were trimmed of adapter/primer sequences and low-quality regions with Trimmomatic v0.33 (Bolger et al. 2014). The trimmed sequences were assembled by SPAdes v3.15.4 (Bankevich et al. 2012), screened for foreign contaminants with FCS (Astashyn et al. 2024), followed by a finishing step using Zanfona (Kieras et al. 2021) to scaffold newly generated assemblies based on available genomes from related species. Raw sequencing reads were uploaded to the Sequence Read Archive.

Results and Data Availability

Sequencing files and scaffolded genome assemblies are available on NCBI with the accession numbers listed in [Table 1](#).

Table 1. Species name, herbarium voucher, and accession number for each genome assembly generated.

Taxon	Herbarium voucher	SRA accession number
<i>Alophia drummondii</i> (Graham) R.C. Foster	225037 IBUG	SRR35942773
<i>Alophia intermedia</i> (Ravenna) Goldblatt	225038 IBUG	SRR35975401
<i>Alophia silvestris</i> (Loes.) Goldblatt	225074 IBUG	SRR32984463
<i>Alophia veracruzana</i> Goldblatt & T.M.Howard	225039 IBUG	SRR35939171
<i>Cipura campanulata</i> Ravenna	190086 IBUG	SRR32974603
<i>Cobana guatemalensis</i> (Standl.) Ravenna	220392 IBUG	SRR35943150
<i>Cypella rosei</i> R.C.Foster	225044 IBUG	SRR35942776
<i>Eleutherine latifolia</i> (Standl. & L.O.Williams) Ravenna	159937 IBUG	SRR32974336
<i>Herbertia lahue</i> (Molina) Goldblatt	197182 IBUG	SRR35943152
<i>Larentia mexicana</i> (C.V.Morton & R.C.Foster) Goldblatt	220394 IBUG	SRR32984341
<i>Nemastylis floridana</i> Small	188371 IBUG	SRR35942812
<i>Nemastylis tenuis</i> (Baker) Benth. & Hook.f. ex S.Watson	159958 IBUG	SRR32984344
<i>Sessilanthra heliantha</i> (Ravenna) Cruden	205975 IBUG	SRR32984464
<i>Tigridia bicolor</i> Molseed	178573 IBUG	SRR35921011
<i>Tigridia coerulea</i> Goldblatt	225040 IBUG	SRR35942784
<i>Tigridia convoluta</i> (Ravenna) Goldblatt	189359 IBUG	SRR35943149
<i>Tigridia conzattii</i> (R.C.Foster) Goldblatt	159588 IBUG	SRR32984455
<i>Tigridia dugesii</i> S.Watson	225048 IBUG	SRR35921132
<i>Tigridia durangensis</i> Molseed ex Cruden	222931 IBUG	SRR35920868
<i>Tigridia ehrenbergii</i> (Schltdl.) Molseed	156360 IBUG	SRR35007315
<i>Tigridia flammea</i> (Lindl.) Ravenna	225050 IBUG	SRR35943155
<i>Tigridia fosteri</i> Goldblatt	225042 IBUG	SRR35943153
<i>Tigridia latifolia</i> (Weath.) Goldblatt	206212 IBUG	SRR32984328
<i>Tigridia longispatha</i> (Herb.) Goldblatt	225041 IBUG	SRR35943144
<i>Tigridia mariaetrinitatis</i> Espejo & López-Ferr	224883 IBUG	SRR35921159
<i>Tigridia meleagris</i> G.Nicholson	161670 IBUG	SRR32984512
<i>Tigridia mexicana</i> Molseed	160421 IBUG	SRR33339707
<i>Tigridia mertonii</i> Molseed	225061 IBUG	SRR36041367
<i>Tigridia multiflora</i> (Herb.) Ravenna	225062 IBUG	SRR35921157
<i>Tigridia oaxacana</i> (Molseed) Goldblatt	225043 IBUG	SRR35942960
<i>Tigridia orthantha</i> (Lem.) Ravenna	166124 IBUG	SRR33339606
<i>Tigridia pavonia</i> (L.f.) Redouté	94865 IBUG	SRR32981532
<i>Tigridia potosina</i> López-Ferr. & Espejo	190633 IBUG	SRR35007284
<i>Tigridia pugana</i> Aarón Rodr. & Ortiz-Cat	222391 IBUG	SRR35924648
<i>Tigridia purpusii</i> Molseed	225065 IBUG	SRR36041701
<i>Tigridia tepoxtlana</i> Ravenna	225068 IBUG	SRR35921126
<i>Tigridia tuitensis</i> (Aarón Rodr. & Ortiz-Cat.) Goldblatt	189360 IBUG	SRR36044440
<i>Trimezia candida</i> (Hassl.) Ravenna	BH000348917	SRR35942914

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