**Begonia elachista** Moonlight & Tebbitt sp. nov.,
an enigmatic new species and a new section of
*Begonia* (Begoniaceae) from Peru

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**Abstract.** The world’s smallest *Begonia, Begonia elachista* Moonlight & Tebbitt sp. nov., is described and illustrated from a limestone outcrop in the Amazonian lowlands of Pasco Region, Peru. It is placed within the newly described, monotypic *Begonia* sect. *Microtuberosa* Moonlight & Tebbitt sect. nov. and the phylogenetic affinities of the section are examined. *Begonia elachista* sp. nov. is considered Critically Endangered under the International Union for the Conservation of Nature (IUCN) criteria.

**Keywords.** *Begonia*, sectional classification, limestone endemics, Peru, Amazonia.

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**Introduction**

*Begonia* L. is a megadiverse, pantropically distributed genus with 1821 currently accepted species (Hughes *et al.* 2015). The majority of species are understory herbs and shrubs with many prized in the horticulture industry. L’Héritier de Brutelle described the first *Begonia* species from Peru, *B. octopetala* L’Hér., in 1788 (L’Héritier de Brutelle 1788). Since this date, the number of *Begonia* species known from the country has increased rapidly. Smith & Schubert (1941) covered 34 species in their treatment of the Begoniaceae of Peru, although it did not cover all species known from the country at the time (e.g. *B. albomaculata* C.DC., described from Peru in 1906 (de Candolle 1906)). Recent field and herbarium work continues to yield new species (e.g. Tebbitt 2011, 2015, 2016) and new records for Peru (e.g. Tebbitt *et al.* 2015). Hughes *et al.* (2015) now list more than 75 species classified in 15 sections from Peru and at least ten species remain undescribed (unpubl. data). The *Begonia* flora of Peru is now the third largest in the Americas after Brazil (242 species) and Colombia (101 species). This study describes a highly unusual new species (*B. elachista* Moonlight & Tebbitt sp. nov.) from a limestone outcrop in lowland Pasco, Peru.
The phylogenetic relationships within Neotropical Begonia were first investigated in depth by Moonlight et al. (2015), who used three cpDNA markers and identified two clades of American Begonia within paraphyletic African Begonia: Neotropical Clade 1 (NC1) and Neotropical Clade 2 (NC2). This study presents a phylogeny of NC2 with increased sampling. We demonstrate that B. elachista sp. nov. is distantly related to all other tuberous western South American species and sections of Begonia; is resolved outside all closely related sections; and, given the species’ unusual morphology, we describe a new section to encompass it (B. sect. Microtuberosa Moonlight & Tebbitt sect. nov.).

Materials and methods

Phylogenetics

The dataset consisted of data from three non-coding plastid DNA regions (ndhA intron, ndhF–rpl32 spacer and rpl32–trnL spacer) and 68 species of Begonia (see Appendix). Species were chosen to be representative of all major groups within NC2 with B. sect. Augustia (Klotzsch) A.DC. chosen as an outgroup. A particular emphasis was placed upon the inclusion of other tuberous, western South American species and sections of Begonia. Ninety two sequences were newly generated for this analysis following the methods described in Moonlight et al. (2015).

Sequences were aligned manually in BioEdit v.7.2.5 (Hall 1999). Bayesian phylogenetic reconstruction was carried out in MrBayes v.3.2.1. (Huelsenbeck & Ronquist 2001). Models of molecular evolution were determined with jModelTest 2.1.7 (Darriba et al. 2012) on a maximum-likelihood topology with the Bayesian information criterion, resulting in the selection of the GTR+I+Γ model. Two searches each comprising two Markov chain Monte Carlo chains were run for 2.5 × 10⁷ generations and sampled every 2500 generations with the burn-in determined as 6.25 × 10⁶ generations following analysis of time series plots in Tracer v.1.6 (Rambaut & Drummond 2013) to ensure adequate sample size.

Taxonomic descriptions

The descriptions of B. sect. Microtuberosa sect. nov. and B. elachista sp. nov. presented herein are derived from herbarium material, material grown at the Royal Botanic Garden Edinburgh, and field observations made by the authors during an expedition to Peru in 2016. Stable links to specimens held at E are included as hyperlinks and images of all cited specimens are available from Hughes et al. (2015). Comparisons to other sections of Begonia were made by reference to Doorenbos et al. (1998) and through reference to living material grown at the Royal Botanic Garden Edinburgh and Glasgow Botanic Gardens.

Results

Phylogenetics

The topology of the 50% majority rule consensus tree (Fig. 1) is entirely consistent with that of Moonlight et al. (2015). We resolve B elachista sp. nov. within a clade of exclusively eastern South American species. The monophyly of B. elachista sp. nov. is well-supported (p = 1.00) and it is resolved as sister to three species of B. sect. Gaerdtia (Klotzsch) A.DC., which will form the reinstated B. sect. Pereira Brade (Moonlight et al. in prep.), and B. sect. Trachelocarpus (Müll.Berol.) A.DC. as reciprocally monophyletic groups. This placement is moderately well-supported (p = 0.88). We resolve all other tuberous western South American species within a distantly-related clade containing all sampled members of B. sect. Euptalum (Lindl.) A.DC.; B. sect. Barya (Klotzsch) A.DC.; all western South American members of B. sect. Knesebeckia (Klotzsch) A.DC.; and B. thyroidea Irmsch., the only Andean member of B. sect. Quadriperigonia Ziesenh.
Fig 1. 50% majority rule consensus tree of MrBayes analysis of Neotropical Clade 2 (NC2) of *Begonia*. Dotted lines indicate posterior clade probabilities < 0.85. P, perenniation of species in NC2: blue, tuberous; green, rhizomatous; yellow, upright stems. G, geographic range of species in NC2: red, western South American; pink, eastern South America; light blue, Central America and Mexico.
Taxonomic Treatment

Class Equisetopsida C.Agardh (Agardh et al. 1825)
Subclass Magnoliidae Novák ex Takht. (Takhtajan 1967)
Superorder Rosanae Takht. (Takhtajan 1967)
Order Cucurbitales Juss. ex Bercht. & J.Presl (von Berchtold & Presl 1820)
Family Begoniaceae C.Agardh (Agardh 1824)

Genus Begonia L. (Linnaeus 1753)

Begonia sect. Microtuberosa Moonlight & Tebbitt sect. nov.
http://www.ipni.org/urn:lsid:ipni.org:names:77160200-1

Diagnosis

Begonia sect. Microtuberosa sect. nov. is most closely related to B. sect. Trachelocarpus and three species of B. sect. Gaerditia. Both of these sections are endemic to eastern Brazil and differ markedly from sect. Microtuberosa sect. nov. in both their habit and floral characteristics (see Table 1). However, all three sections share their filaments fused at least at the base and B. sect. Microtuberosa sect. nov. further shares its androecium morphology with B. sect. Pereira and its lack of bracteoles with B. sect. Trachelocarpus. The majority of both floral and vegetative characters are, however, markedly different among the three sections.

Begonia sect. Microtuberosa sect. nov. is readily identified as the only Neotropical section of Begonia with male flowers with four or fewer stamens, and the combination of ovaries with two or three locules and entire placentas, and a tuberous habit.

Etymology

The name ‘Microtuberosa’ emphasises the diminutive and tuberous habit of the type species.

Type species

Begonia elachista Moonlight & Tebbitt sp. nov.

Description

Caulescent, tuberous herbs, perennial. Stems erect. Stipules persistent, entire. Leaves alternate, 2–4(–6), basifixed, blade symmetrical or subsymmetrical, veins palmate. Inflorescence axillary, an asymmetric dichasial cyme, protandrous, bracts persistent. Male flowers: with 2–4 free perianth segments; stamens 2 or 4, filaments united into a column for more than half their length, anthers elliptic, dehiscing via lateral slits, connective not projecting. Female flowers: bracteoles absent, with 2–3 free perianth segments; ovary and fruit with 2–3 wings, wings equal, 2–3-locular, placentas entire, bearing ovules on both surfaces; styles 2–3, free to base, bifid from about ⅔ their height, stigmatic papillae in a once spirally twisted band. Fruit a capsule. Seeds not examined.

Distribution

On a limestone outcrop in lowland Amazonian Peru to the east of the Chemillén Cordillera at an altitude of 430 m.
Table 1. Comparison between *Begonia* sect. *Microtuberosa* Moonlight & Tebbitt sect. nov. and closely related sections.

| Character      | *B. sect. Microtuberosa* | *B. sect. Pereira* | *B. sect. Trachelocarpus* |
|----------------|--------------------------|--------------------|----------------------------|
| Habit          | Tuberous, stems erect    | Lacking tubers or rhizomes, stems erect | Rhizomatous (creeping up the side of a tree), lacking an erect stem |
| Leaves         | Alternate                | Alternate          | Whorled at the apex of rhizome |
| Venation       | Palmate                  | Pinnate, palmate-pinnate | Pinnate |
| Inflorescence  | Bisexual                 | Bisexual           | Separate male and female |
| Bracteoles     | Absent                   | Absent or 2 spaced from the base of the ovary | Absent |
| Androecium     | Filaments fused for more than half their length; 2 or 4 stamens; anthers elliptic, dehiscing through lateral slits | Filaments fused for less than half their length; stamens many; anthers obovate, dehiscing through lateral slits | Filaments entirely fused into a column; stamens many; anthers obovate, dehiscing through lateral pores |
| Male perianth  | 2–4 tepals               | 4 tepals           | 2 tepals                    |
| Ovaries        | 2–3 locular with 2–3 styles; 1 placental branch per locule | 3 locular with 3 styles; 2 placental branch per locule | 3 locular with 3 styles; 1 placental branch per locule |
| Female perianth| 2–3 tepals               | 5 tepals           | 3 tepals                    |

*Begonia elachista* Moonlight & Tebbitt sp. nov. sect. *Microtuberosa*  
[http://www.ipni.org/urn:lsid:ipni.org:names:77160201-1](http://www.ipni.org/urn:lsid:ipni.org:names:77160201-1)  
Figs 2, 3

**Diagnosis**

*Begonia elachista* sp. nov. is a highly distinct species with an unusual combination of features that is easily recognized as the only Peruvian species of *Begonia* that reaches maturity at fewer than 5 cm in height. It is also unique within Peru in having ovate leaves smaller than 3 × 3 cm and a combination of entire placentae and a tuberous habit.

**Etymology**

The epithet ‘elachista’ comes from the Greek for ‘least’ and emphasizes the diminutive size of this species, which is the smallest known species of *Begonia*.

**Type**

PERU: Region Pasco, Prov. Oxapampa, Dist. Palcazu, Parque Nacional Yanachaga-Chemillén, sector Paujil, 150 m from entrance to Las Cavernas on trail from Paujil, 10°20’40" S, 75°15’1" W, 432 m, 25 Feb. 2016, Moonlight & Daza 318 (holo-: MOL; iso-: E, MO, USM).
Fig 2. *Begonia elachista* Moonlight & Tebbitt sp. nov. A. Habit. B. Male flower, front view. C. Branch of infructescence. D. Female flower, side view. E. Stamens, front and side view. F. Style, front and back view. Scale bars: A–D = 1 cm; E–F = 1 mm. Drawn by Claire Banks. From *P. Moonlight & A. Daza 318* (E).
Additional material

PERU: Region Pasco, Prov. Oxapampa, Dist. Palcazu, Parque Nacional Yanachaga-Chemillén, sector Paujil, Quebrada Tunel, 10°20’ S, 75°15’ W, 429 m, 17 Mar. 2008, Vásquez, Monteagudo, Huamantupa & A. Peña 34030 (E, HOXA, HUT, MO, USM).

Description

Caulescent, tuberous herb. Tuber subglobose, 1–2 mm in diam. Stems 1–3 per tuber, erect, ca 0.2 mm in diam., 5–30 mm long, unbranched, internodes 1.5–7.5 mm long, glabrous, light green. Stipules persistent, narrowly lanceolate, 0.5–1.5 × 0.2–0.5 mm, apex acuminate, aristate, terminal hair ca 0.4 mm long, margin entire, with 1–2 ciliate hairs to 0.2 mm on each side. Leaves 1–4, alternate, basifixed; petiole orientated in same direction as the main vein of blade, 8–25 mm long, glabrous, blade symmetrical to subsymmetric, ovate to suborbicular, 8–30 × 7–25 mm, membranous, apex obtuse, base cordate, basal lobes not overlapping, sinus 0.5–2 mm deep, margin irregularly crenate, ciliate, the hairs to 0.3 mm, upper surface glabrous, light grey-green, lower glabrous, light grey-green, veins palmate, 5–7, secondary veins indistinct. Inflorescences 1–2, axillary, arising from axis of each leaf, erect, an asymmetric dichasial cyme, with 1–2 branches, bearing up to 2 male flowers and up to 2 female flowers, usually protandrous but basal-most female flower often opening concurrently with the apical male flower; peduncle 5–40 mm long, glabrous; pedicels of male flowers 2–6 mm long, glabrous; pedicels of female flowers 1–5 mm long, glabrous; bracts persistent, elliptic, 1.5–2.5 × 0.1–0.3 mm, apex acuminate, margin entire, glabrous or with up to 2 ciliate hairs to 0.2 mm on each side, dark brown.

Fig 3. *Begonia elachista* Moonlight & Tebbitt sp. nov. A. Whole plant. B. Male and female flower, front view. C. Female flower, side view. D. Habit and associated vegetation. E–F. Habitat and wild population. Scale bars: A = 1 cm; B = 5 mm; C = 2 mm; D = 2 cm; E–F = 10 cm. Photographed by Peter Moonlight. All from *P. Moonlight & A. Daza 318* (E).
Male flowers: tepals 2–4, spreading, white, outer two lanceolate to oblanceolate, 3–7.5 × 1–2.5 mm, apex obtuse to rounded, margin entire, glabrous, inner 1–2 elliptic if present, 3–4 × 0.75–1.25 mm, apex obtuse to rounded, margin entire, glabrous; stamens 2 or 4, yellow, filaments 0.25–0.75 mm long, united on a 0.75–1 mm column, anthers elliptic, 0.75–1.5 mm long, often with long and short thecae on the same anther, dehiscing via lateral slits, connectives not projecting, symmetrically basifixed. Female flowers: bracteoles absent; tepals not persisting in fruit, 2 or rarely 3, spreading, white, narrowly elliptic to oblanceolate, equal, 3–4.5 × 0.75–2.5 mm, apex obtuse to rounded, margin entire, glabrous; ovary body ovoid, 1.5–2.5 × 1–2.5 mm, glabrous, white, subequally 2–3-winged, wings rounded-oblong, apical edge of wing truncate to convex, basal edge rounded, apex acute to obtuse, 2–2.5 mm long, 1–1.75 mm wide; 2–3-locular, placentas entire, bearing ovules on both surfaces; styles 2–3, yellow, free to base, 2–3 mm long, bifid from about ⅔ their height, stigmatic papillae in a once spirally twisted band. Fruiting pedicel to 5 mm long. Fruit body globose, to 1.5–2.5 × 2–2.5 mm, glabrous, drying brown, wings same shape and size as in ovary. Seeds not examined.

**Distribution and habitat**

*Begonia elachista* sp. nov. is known only from the type locality in the Peruvian region of Pasco (Oxapampa Province) and has been collected on calcareous rocks by the entrance to a cave within primary lowland Amazonian forest, at an altitude of 430 m. It was observed growing on rocks free from other vascular plants in association with various bryophyte species in the almost continual shade of the surrounding forest.

**Conservation status**

The known range of *B. elachista* sp. nov. consists of the area immediately around a single cave mouth and nearby limestone outcrops in sector Paujil of Parque Nacional Yanachaga-Chemillén (AOO < 1 km²). There are no other known limestone outcrops in sector Paujil of Parque Nacional Yanachaga-Chemillén or the surrounding areas thus its range is likely limited to this site. Around 5,000 plants are found at this locality and the population appeared stable during fieldwork in February 2016. Although the area is currently protected and tourists are prohibited from visiting the site, the national park authorities are considering building a tourist trail to the cave. The resulting increased footfall would put considerable pressure on the species’ habitat and inevitably decrease the population size. Accordingly, we classify *B. elachista* sp. nov. as Critically Endangered: CR B2 ab(iii) (IUCN 2001).

**Discussion**

The tuberous habit and western South American range of *B. elachista* sp. nov. suggest a close relationship with other tuberous Andean species of *Begonia* but this is not supported by our analysis. The majority of tuberous Andean *Begonia* species are currently classified in *B. sect. Eupetalum*, which is distinguished by its geophytic tubers or fleshy rhizomes and relatively large flowers (Doorenbos *et al.* 1998; Tebbitt 2015). All other tuberous Andean species are classified within *B. sect. Barya*, *B. sect. Knesebeckia* and *B. sect. Quadriperigonia*, and all four sections differ from *B. elachista* sp. nov. in a suite of characters including their bifid placentae (except *B. lutea* L.B.Sm. & B.G.Schub.), more numerous stamens and female tepals, and much larger size. We resolve *B. sect. Microtuberosa* sect. nov. as distantly related to all tuberous species of Andean *Begonia* and most closely related to rhizomatous and scandent sections from southeast South America. The morphological differences between *B. sect. Microtuberosa* sect. nov. and these sections are outlined above (Table 1) and, in combination with the placement of *B. elachista* sp. nov. outside of these sections, strongly support the description of a new section.

The large morphological disparity between *B. elachista* sp. nov. and its nearest relatives is typical of that found in limestone cave endemics (Chung *et al.* 2014). Such species are typically small, often tuberous or rhizomatous, and usually have relatively symmetrical leaves and small, white flowers. Examples of
this syndrome in *Begonia* are found across sections and continents and include *B. antsingyensis* Humb. ex Keraudren & Bosser sect. *Quadrilobaria* A.DC. (Madagascar); *B. cavum* Ziesenh. sect. *Unassigned* (Brazil); *B. exigua* Irmsch. sect. *Knesebeckia* (Klotzsch) A.DC. (Mexico); *B. hoehneana* sect. *Reichenheimea* (Klotzsch) A.DC. (Vietnam); *B. schulziana* Urb. & Ekman sect. *Reichenheimea* (Klotzsch) A.DC. (Borneo); and many others. This striking convergence among unrelated *Begonia* species on similar substrates in *Begonia* is worthy of further investigation.

That *B. sect. Microtuberosa* sect. nov. is nested within a group of eastern Brazilian species suggests it represents an independent dispersal across the Amazon basin, in addition to those identified in Moonlight *et al.* (2015). The majority of lowland Amazonia represents unsuitable habitat for most *Begonia* species but the genus appears to have dispersed across the area multiple times. The discovery of a further dispersal event highlights the abundance of ‘rare’ long-distance dispersal events within *Begonia*.

*Begonia elachista* sp. nov. is one of a number of recently described species of Peruvian *Begonia*. The number of species known from this country has risen from the 34 covered in the Flora of Peru (Smith & Schubert 1941) to more than 75 today (Hughes *et al.* 2015). This continued rapid rate of species discovery suggests many more species may remain undiscovered within the country, particularly in limestone areas.

A number of species are contenders for the world’s smallest *Begonia*, and many have been designated epithets emphasising their diminutive statures. The first of these was *B. minor* Jacq. in 1787, although in this case the name only implied it was slightly smaller than the 20 or so species previously described, and it still grows to more than 1 m. Perhaps the most delicate known *Begonia* species is the Malaysian *B. sibthorpioides* Ridl., whose leaves and flowers are both smaller than those of *B. elachista* sp. nov.; however, the stem of *B. sibthorpioides* trails to 10 cm. Malagasy *Begonia* also include a number of tiny species, including *B. leandrii* Humb., *B. nana* L’Hér. and *B. perpusilla* A.DC., while the smallest mainland African species is *B. wilksii* Sosef, but all exceed the 3 cm total height of *B. elachista* sp. nov. in either their inflorescence height or petiole length. The recently described Vietnamese *B. minuscula* Aver. and Sumatran *B. lilliputana* M.Hughes are both small, but the rhizomes of the former reach 6 cm while the leaf length of the latter equals the entire height of *B. elachista* sp. nov. *Begonia sleumeri* L.B.Sm. & B.G.Schub. is particularly notable in being a small tuberous species from Andean South America. This Argentinian species has smaller leaf blades of a similar size (1–3.1 × 1.4–4.6 cm) to *B. elachista* sp. nov. but has larger tubers (0.5–2 cm in diam.), sometimes has taller stems (up to 4.5 cm tall), often has longer petioles (1.2–5.3 cm long), and almost always has larger flowers. We believe *B. elachista* sp. nov. is the smallest known *Begonia* species in the world.

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### Appendix. List of voucher specimens and Genbank accession numbers used in phylogenetic analyses.

| Species                    | Section | Voucher specimen | Genbank voucher |
|----------------------------|---------|------------------|-----------------|
| Begonia dregei             | Augustia| McLellan 415 (E) | JF756338        |
| Begonia sutherlandii       | Augustia| Thomas 08-140 (E)| JF756337        |
| Begonia boliviensis        | Barya   | Forrest 182 (E)  | JF756346        |
| Begonia monadelpha         | Barya   | Sarkinen 2205 (E)| KP713005        |
| Begonia cyathophora        | Cyathocnemis| no voucher    | KP713075        |
| Begonia clarkei            | Eupetalum| Tebbitt 824 (E)  | KX756293        |
| Begonia froebelii          | Eupetalum| Tebbitt 789 (COL)| KX756288        |
| Begonia geraniifolia       | Eupetalum| Moonlight 116 (E)| KX756283        |
| Begonia lutea              | Eupetalum| Jara AMB 332 (COL)| KX756287       |
| Begonia micranthera 1      | Eupetalum| Sarkinen 2029 (E)| KP713032        |
| Begonia micranthera 2      | Eupetalum| Sarkinen 2043 (E)| KP713066        |
| Begonia tumbezensis        | Eupetalum| Tebbitt 770 (QCNE)| n/a            |
| Begonia weberbaueri        | Eupetalum| Sarkinen 2216 (E)| KP713024        |
| Begonia edmundoi           | Gaerdia | Forrest 196 (E)  | KP712994        |
| Begonia lubbersii          | Gaerdia | Forrest 194 (E)  | KP712981        |
| Begonia pseudolubbersii    | Gaerdia | GBO 045-023-92 (GBG)| KP713072      |
| Begonia carolineafolia     | Gireoudia| Tebbitt 80 (BKL)| KP713033        |
| Begonia conchifolia        | Gireoudia| Tebbitt 89 (BKL)| KP713021        |
| Begonia multinervia        | Gireoudia| Tebbitt 131 (BKL)| KP713023        |
| Begonia nelumbifolia       | Gireoudia| Hollands 09 (E)  | KP713040        |
| Begonia mauraandiae 1      | Gobenia | Jara, A (2758)  | KX756291        |
| Begonia mauraandiae 2      | Gobenia | Duruisseau s.n. (LBG)| KX756281   |
| Begonia hitchcockii        | Gobenia | Moonlight 123 (E)| KX756290        |
| Begonia sp. sect. Gobenia  | Gobenia | EQ-JD-04 (LBG)  | KX756292        |
| Begonia fissistyla         | Hydristyles| Forrest 157 (E): E00205201| KP713051    |
| Begonia aif. incarnata     | Knesebeckia| Twyford 587 (E)| KP713065        |
| Begonia bifurcata 1        | Knesebeckia| Tebbitt 782 (QCNE)| n/a            |
| Begonia bifurcata 2        | Knesebeckia| Moonlight 105 (E)| KX756296       |
| Begonia bifurcata 3        | Knesebeckia| Moonlight 117 (E)| KX756278       |
| Begonia bullatifolia 1     | Knesebeckia| Peng 21323 (HAST)| KP713073       |
| Begonia bullatifolia 2     | Knesebeckia| Duruisseau s.n. (LBG)| KX756303    |
| Begonia erythrocarpa       | Knesebeckia| Sarkinen 2058 (E)| KP713031       |
| Begonia incarnata          | Knesebeckia| Peng 20869 (HAST)| KP713069       |
### Appendix (cont.).

| Species                       | Section               | Voucher specimen       | Genbank voucher |
|-------------------------------|-----------------------|------------------------|-----------------|
| Begonia ludwigii              | Knesebeckia           | Peng 23333 (HAST)      | KP712990        |
| Begonia maynensis             | Knesebeckia           | Peng s.n. (HAST)       | KP713063        |
| Begonia parcifolia            | Knesebeckia           | Tebbitt 783 (QCNE)     | KX756277        |
| Begonia piurensis             | Knesebeckia           | Moonlight 111 (E)      | KX756276        |
| Begonia santos-limae          | Knesebeckia           | Peng 21320 (HAST)      | KP713016        |
| Begonia serotina              | Knesebeckia           | Tebbitt 776 (QCNE)     | KX756284        |
| Begonia sp. A                 | Knesebeckia           | Moonlight 156 (E)      | KX756295        |
| Begonia sp. B                 | Knesebeckia           | Moonlight 159 (E)      | KX756301        |
| Begonia foliosa               | Leptia                | Unknown s.n. (E)       | KP713060        |
| Begonia elachista             | Microtuberosa         | Moonlight 318 (E)      | KX756285        |
| Begonia elachista             | Microtuberosa         | Moonlight 318 (E)      | KX756297        |
| Begonia oxacana               | Parietoplatliën       | no voucher             | KX756280        |
| Begonia buddleifolia          | Pilderia              | Jara 2599 (E)          | KX756286        |
| Begonia glandulifera          | Pilderia              | Gardner 6608 (E)       | KX756294        |
| Begonia marniannensis         | Pilderia              | Daruisseau s.n. (LBG)  | KX756299        |
| Begonia gracilis              | Quadriperigonia       | Badcock 9 (E)          | KP713004        |
| Begonia thyrsoidae            | Quadriperigonía       | Tebbitt 809 (E)        | KP713078        |
| Begonia rossmanniae 1         | Rossmannia            | Scherberich 1095 (LBG) | KX756300        |
| Begonia rossmanniae 2         | Rossmannia            | Moonlight 315 (E)      | KX756302        |
| Begonia holtonis              | Ruizopavonia          | Forrest 152 (E): E00205231 | KP713062        |
| Begonia meridensis            | Ruizopavonia          | Forrest 151 (E): E00205112 | KP713057        |
| Begonia integerrima           | Solanthera            | Tebbitt 69 (BKL)       | KP713000        |
| Begonia radicans              | Solanthera            | GBG 009-089-95 (GBG)   | JF756345        |
| Begonia solanthera            | Solanthera            | GBG 021-070-04 (GBG)   | KP712999        |
| Begonia fulvosetulosa         | Trachelocarpus        | Sénéchal s.n. (LBG)    | KX756279        |
| Begonia herbacea              | Trachelocarpus        | Forrest 163 (E): E00205153 | KP713015        |
| Begonia lanceolata 1          | Trachelocarpus        | no voucher             | KP713068        |
| Begonia lanceolata 2          | Trachelocarpus        | Sénéchal s.n. (LBG)    | KX756289        |
| Begonia crenophila            | Unassigned            | Tebbitt 753 (LPB)      | KX756282        |
| Begonia urubambensis          | Unassigned            | Moonlight 244 (E)      | KX756298        |
| Begonia heydeli               | Urniformia            | Peng 22624 (HAST)      | KP713030        |
| Begonia imperialis            | Weibachia             | Forrest 187 (E)        | KP713008        |
| Begonia purpusii              | Weibachia             | Tebbitt 70 (BKL)       | KP713028        |