



Figures 51–56. *Villadia aureistella*. **Figure 51.** *V. aureistella* ex situ, Cajabamba. **Figure 52.** Detail of leaves (left) and young shoot (right). **Figure 53.** Detail of spike of *V. aureistella*. The golden yellow flowers have strongly recurving petals, a unique character among the Peruvian species. **Figure 54.** (above, left to right) detail of, flower bud, flower showing bract disposition, flower section, fruit. (beneath, left to right) opposite bract, lateral bracts (2), sepals (2), petals, lateral view, outer side, inner side, gynoeceium. **Figure 55.** *V. aureistella* in habitat growing on the rock walls around Cajabamba. **Figure 56.** Young *V. aureistella* at Liclic. It could easily be mistaken for *V. paniculata*.

narrowly ovate, subacute, inner side concave, outer side convex and sometimes with reddish dots, with a hyaline spur at base. Pedicels absent. Sepals deltoid to oblong, obtuse, 3–6 mm long, 1.3–1.8 mm wide, light green. Petals oblong, acute-deltoid at tip, united along margins, curved inwards, tips slightly spreading

outwards, 5.5–6 mm long, 2.5–2.8 mm wide, outer surface convex, green-yellow, inner surface concave, light green, margins entire. Stamens ten, the five epipetalous 2.5–3.2 mm long, the antesealous 3.5–4.2 mm long, filaments white, 0.4 mm diam Anthers deltoid-ovoid, 0.8 × 0.7 mm, yellow. Gynoeceium ovoid,

3.2 × 4.8 mm. Carpels five, 2.5–3.5 mm long, light green. Style 0.6 mm diam, 0.8 mm long, green, stigma white. Nectary scales oblong-spathulate, 1–1.2 mm. Fruit a dehiscent capsule, 4 × 5.2 mm, dry carpels reddish (Fig 47). Seeds narrowly ovoid, 0.65–0.70 mm long, 0.25–0.35 mm diam, orange.

PERU. Dept. Cajamarca, Prov. Celendín, Dist. Celendín, canyon of Río Marañón above Balsas, 3–4 km below summit of the road to Celendín, 2950 m, 23 May 1964, *P. C. Hutchison & J. Kenneth Wright 5280* (USM 43,488). Prov. Cajamarca, Dist. Baños del Inca, Route to ex-Estate Sangal, towards Encañada, 3190 m, 07°04'46" S, 78°23'55" W, 2 Apr 2002, *I. Sánchez-Vega 11355* (CPUN 15470). Dist. Encañada, near Encañada, on rocks, 2870 m, 4 May 1970, *A. Sagástegui 7384* (US 2588,359). Road from Encañada to Celendín, 1 km before Quinuamayo, growing with *P. nivalis* forma *diminuta*, 3410 m, 07°03'14" S, 78°19'44" W, 30 Apr 2000, *G. Pino 269* (USM 217,137). Prov. San Marcos, Dist. Gregorio Pita: road from San Isidro to Casablanca, on rocks, 7°14'38" S, 78°00'33" W, 3660 m, 15 May 2003, *G. Pino 1147*. Río Seco, 7°13'09" S, 78°12'07" W, 3097 m, 17 May 2002, *RRP 388*. (USM 217,138) (Fig 45). Ullillín, 7°15'47" S, 78°08'03" W, 2924 m, 24 Jun 2001, *RRP 26*. Prov. San Pablo, Dist. Tumbadén: Inгатambo, west of the floodgate on grassy highland, 6°55'20" S, 78°40'04" W, 3240 m, 13 Mar 2002, *I. Sánchez-Vega and A. Miranda Leiva 11,318* (CPUN 15,431) Loc. Cit., 10.5 km from detour of the road Cajamarca-Hualgayoc, on rocky outcrops, 6°55'20" S, 78°40'04" W, 3450 m, 25 Feb 2004, *I. Sánchez-Vega and W. Díaz Miranda 12,554* (CPUN 17,987). Dept. La Libertad, Prov. Sánchez Carrión, Dist. Huamachuco, road to Cajabamba, between Sausacocha and Cajabamba, 7°41' S, 78°01' W, 3000 m, 15 Feb 1983, *D. N. Smith & R. Vásquez 3383* (USM 125,278).

This species was collected for the first time in Celendín by Hutchison in 1964, who never named it, and it was found again by the team of the Botanical Garden of San Marcos led by Olivier Klopfenstein while looking for new species of *Peperomia*. From a distance this plant looked to them like a miniature *Echeveria* with yellow flowers (Fig 48), a character that can be even more confusing in the dry period (Fig 49). Vegetative shoots emerge as rosettes (Fig 50), flowers with campanulate flowers with erect, stiff, adnate petals are born in terminal spikes of the flowering stems,

which at first were thought to be lateral inflorescences. A closer look shows that vegetative and flowering branches emerge separately from the procumbent primary stem buried in moss. The plant is named for Olivier Klopfenstein, born in Switzerland, forester and amateur botanist who came to Peru to visit his wife's country and remained for many years. He is the founder of the Botanical Garden of San Marcos, a tireless researcher of Peruvian flora, and co-author of several species of *Peperomia*. This is a homage to all his work during his stay among us. We hope he will return someday to continue exploring our land.

8. *Villadia aureistella* PINO & CIEZA sp. nov.

Planta succulenta glabra florens usque ad 28–30 cm alta. Caulis erectus, ad basim 6–10 mm diam, ramis erectis 1–6, 3–5 mm diam, griseobrunneis. Rami secundarii steriles 3–6 cm longi, floriferi usque ad 30 cm longi, caulibus 1.8–2 mm diam rubiginosis. Folia succulenta imbricata spiraliter disposita sessilia anguste ovata vel anguste oblonga 8.5–10 mm longa, 1.8–2.5 mm lata, subacuta, flavovirentia. Inflorescentia terminalis spica 4–8 cm longa, 16–32 floribus sessilibus. Bractee anguste ovatae-oblongae, 5–8 mm longae 1.5–1.8 mm latae, in quoque flore ternae, angulo fere recto divergentes. Sepala anguste ovata vel triangularia 4–6 mm longa 1.5–1.8 mm lata. Petala oblonga acuta 7.5–8 mm longa, 2.2–2.6 mm lata, flava, a basi usque ad dimidium vel $\frac{2}{3}$ partem coalita, demum deltoidea extrorsum recurvata. Stamina filamentis albis. Carpela 5 fusiformia alba. Floret ab Majo ad Julium.

Holotype: Dept. Cajamarca, Prov. Cajabamba, Dist. Cajabamba, outskirts of the city of Cajabamba, road from Cinco Esquinas to the waterfall of Cochecorral, on rock-walls along field-borders, growing with *Echinopsis pachanoi*, *Opuntia ficus-indica*, *Peperomia galioides*, *Opuntia exaltata* [*Austrocylindropuntia subulata* ssp. *exaltata*], 7°36'30" S, 78°02'35" W, 2600 m, 29 Jul 2005, *RRP 810* (USM 217,136).

A succulent glabrous herb, 28–30 cm tall when flowering. Primary roots 3–6, 3.5–5 cm long, 2–2.5 mm diam, light brown, secondary roots numerous, 1–1.2 mm diam, 3–4 cm long. Stem decumbent, apices erect, 6–10 mm diam at base, gray-brownish, branching profusely. Primary branches 1–4 (–6), erect, 3–5 mm diam, up to 15 cm long (Fig 51). Secondary branches numerous, vegetative shoots (1–) 3–6 cm long, flowering shoots up to 30 cm long, stem 1.8–2 (–4.5) mm, reddish. Leaves succu-

lent, sessile, spirally attached to stem, denser on young shoots, attached to stem at a right angle, tip later recurving upwards, narrowly ovate to oblong, 8.5–10 (–13) mm long, 1.8–2.5 mm wide, 1.5–1.8 mm thick, obtuse-subacute, upper side flat to slightly convex, lower side convex, yellowish green, reddish near tip, margins entire (Fig 52).

Inflorescence a terminal spike 4–6 (–8) cm long (Fig 53). Flowers 16–32, appearing from May to July, the lower third rarely geminate. Rachis 2–2.2 mm diam, reddish. Flower buds 6 × 5 mm, light green. Bracteoles three per flower, the largest opposite the stem and the other two lateral, placed at 90° one at each side, 5–8 mm long, 1.5–1.8 mm wide, narrowly ovate-oblong, obtuse to acute, upper side concave, lower side convex, slightly curved upwards, with a hyaline spur at base. Pedicels absent. Sepals narrowly ovate to oblong, obtuse, 4–6 mm long, 1.5–1.8 mm wide, light green. Petals oblong, acute-deltoid at tip, united at the base, recurving along the distal two-thirds, 7.5–8 mm long, 2.2–2.6 mm wide, outer surface convex, greenish yellow to bright yellow, paler at base, inner surface concave, yellow, margins entire. Stamens ten, the five epipetalous 4–4.2 mm long, the antesealous 6–6.2 mm long, filaments white, conical, 0.4 mm diam. Anthers deltoid-ovoid, 0.4 × 0.5 mm, yellow. Gynoecium ovoid, 3.2 × 4 mm, carpels five, 3.5–4 mm long, whitish. Style 2 mm long, light green, stigma white. Nectary scales widely oblong, 1 × 1 mm, yellowish green. Fruit a dehiscent capsule, 6.5 × 7 mm, dry carpels light brown tinged with orange. Seeds narrowly ovoid, 0.65–0.75 mm long, 0.30–0.35 mm diam, light brown (Fig 54).

PERU. Dept. Cajamarca, Prov. Cajabamba, Dist. Cajabamba, Cajabamba, road from Cinco Esquinas to Cohecocorral, 7°36'24" S, 78°02'30" W, 2730 m, 2 Feb 2008, *G. Pino 1895*. Prov. San Marcos, Dist. José Manuel Quiroz, road from Liclic to Platanillo, on borders of footpath partially shaded by shrubs, growing with *Villadia thiedeii*, 7°20'09" S, 77°59'16" W, 2920 m, 1 Feb 2008, *G. Pino 1883*.

This species was discovered by the San Marcos Botanical Garden team during an expedition to Cajabamba and was first noticed by Nelson Cieza on 22 January 2004 growing on rocky walls around the city (Fig 55). Later we discovered that plants we had supposed to be a new species found at Liclic and Alisopata and growing with *V. thiedeii* and *V. paniculata* also belonged to this new taxon. Young plants have erect reddish stems with terete, al-

most linear yellowish-green leaves, a character it shares with *Villadia paniculata* (described below), making the two indistinguishable without flowers (Fig 56). A photo of *V. aureistella* was published by Low (2006). It is unique among the known species of *Villadia* in Peru in having showy flowers with petals totally recurved, forming loops, as is found in the Mexican *Villadia recurva* MORAN, KIMNACH & UHL. The name "aureistella" refers to the golden, star-shaped flowers.

9. *Villadia thiedeii* PINO & CIEZA sp. nov.

Species habitu cum Villadia virgata congruens, sed differt ab ea ramificatione staturaque majoribus, usque ad 35 cm alta, foliis longioribus anguste triangularibus 9–13 mm longis 2–3 mm latis glaucis saepe rubescentibus; inflorescentia longiore spica 3–13 cm longa 13–30 floribus sessilibus minoribus, sepalis 3.2–3.5 mm longis 1.4–1.6 mm latis, petalis oblongis acutis 3.3–3.7 mm longis 1.4–1.6 mm latis pallide flavovirentibus apice introrsum recurvato. Floret ab Decembro ad Februarium.

Holotype: Dept. Cajamarca, Prov. San Marcos, Dist. José Manuel Quiroz, road from Liclic to Platanillo, on borders of footpath partially shaded by shrubs, growing with *Villadia aureistella*, *Peperomia cereoides* Pino et Cieza, *Peperomia rupiseda* DC, and *Sedum isidorum*, 7°20'09" S, 77°59'16" W, 2920 m, 1 Feb 2008, *G. Pino 1882* (USM 218,481).

A succulent glabrous herb, 14–35 cm tall when flowering. Roots 3–7 cm long, 0.1–0.25 mm diam, grayish. Stem erect, 1.8–4 (–5) mm diam at base, gray-brownish, branching every 5–8 cm. Branches 1–5, erect, vegetative shoots 7–13 cm long, flowering shoots up to 20 cm long, stem 2–2.5 mm diam, glaucous, reddish where exposed and at base in young plants (Fig 57). Leaves succulent, sessile, spirally arranged, crowded near the base and in young plants attached at an acute angle, straight to slightly upcurved, narrowly ovate to narrowly deltoid, (6–) 9–13 mm long, 2–3 mm wide, 1.4–3 mm thick, obtuse-subacute, upper side flat to slightly concave, lower side convex, light green-glaucous, reddish in very exposed plants, margins entire (Fig 58).

Inflorescence a terminal single spike 3–9 (–13) cm long, rarely with 3–5 basal branches (Fig 59). Flowers 13–30, appearing from December to February, rarely geminate along the lower third. Rachis 1.8–3 mm diam, light green-glaucous. Flower buds 4.5 × 4 mm. Bracteoles three per flower, the largest opposite the stem and the other two laterally placed at 90°, one