3000 m, and it reaches Cajamarca perhaps at its northernmost locality, where it grows relatively lower at 1800–2200 m. It probably also exists in the intervening department of La Libertad, though it has not yet been reported there. Despite this ample range, it is very scarce in nature and difficult to find. It has also been reported to be somewhat difficult in cultivation. The distinctive characters of this species are its overall light-green-glaucous color, very narrowly ovoid to almost terete leaves (Fig 24), diffuse scorpioid cincinni of pure white flowers with petals plicate on the outer surface, and margins that are occasionally undulate (Fig 25).

5. *Sedum isidorum* Pino sp. nov.

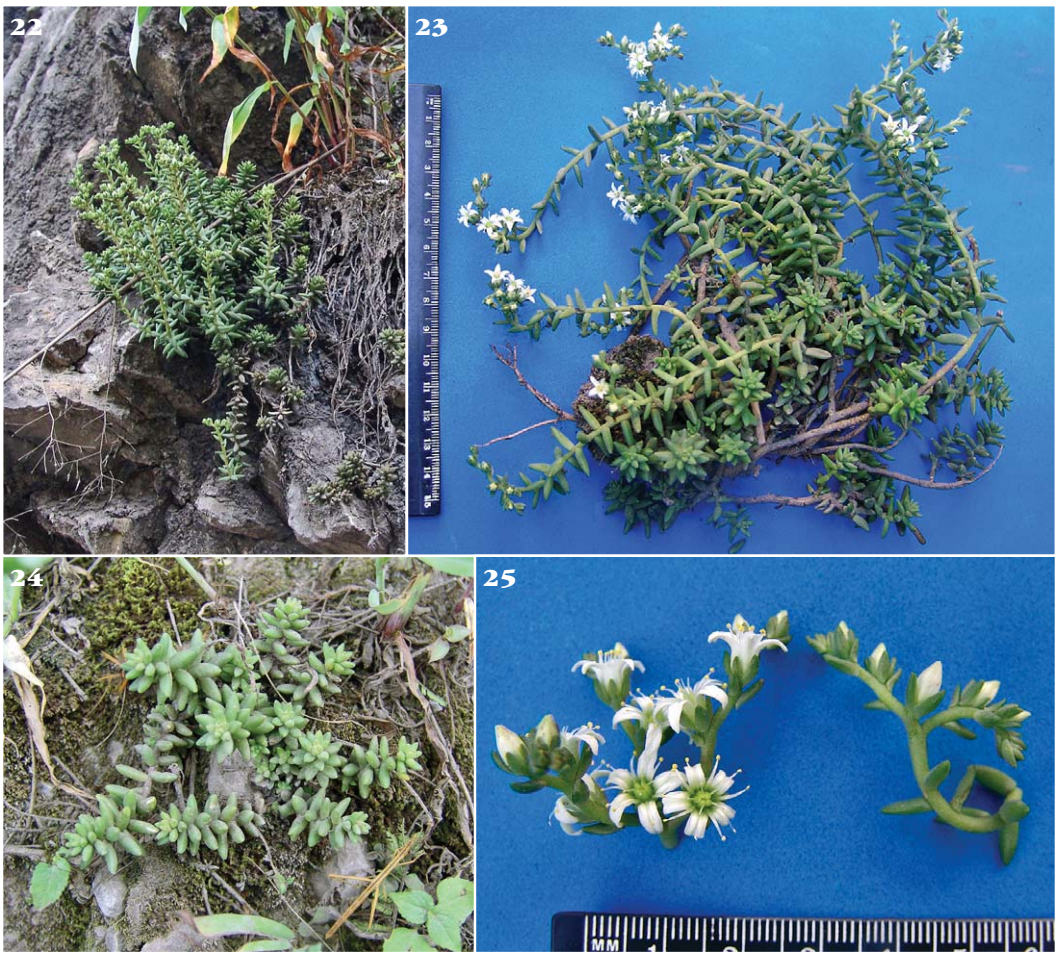
*Planta succulenta glabra e basi ramosa 8–13 cm alta. Caulis ad basim erectus 6–10 mm dia*m, *griseobrunneus, 1–6 ramis erectis vel leviter decumbentibus. Rami secundarii conspicue erecti 4–14, sterili 1.5–4 cm longi, florigeri 6–13 cm longi, caule 1.8–2 mm diam rubro purpureo. Folia succulenta imbricata spiraliter disposita sessilia anguste ovoidea vel subtriangularia 8–12 mm longa, 3–5 mm lata, subacuta, e glauci rubentia in apricis. Inflorescentia terminalis 1–3 cincinnis alternis 0.5–3 cm longis, 6–12 floribus sessilibus. Sepala ovata 1.5–5 mm longa 1–2 mm lata. Petala oblonga acuta 6–7 mm longa, 1.8–2 mm lata, extus subcarinata, a basi usque ad dimidiam partem coalita, demum deltoidea extrorsus recurvata, albida erubescentia. Stamina filamentis rubescentibus. Carpela 5 fusiformia rosea. Floret a Majo ad Julium.*

Holotype: PERU. Dept. Cajamarca, Prov. Cajamarca, Dist. Cajamarca, road from Cajamarca to Cumbemayo, km 6, on rocky wall with moss, growing with *Peperomia andina* Pino, 7°10′23″ S, 78°31′51″ W, 3050 m, 30 Apr 2007, *G. Pino 1710* (USM 217,146) (Fig 26).

A succulent glabrous herb, branched from the base, 8–15 (–30) cm tall. Basal stem erect, 2–6 cm long, 6–10 mm diam, 1–6-branched, each primary branch erect to slightly decumbent, rooting along the sides, 3.5–4 (–6) mm diam at base, 2–8 cm long, light gray brownish. Secondary branches 4–14, erect, vegetative shoots 1.5–4 cm long, flowering shoots 6–13 cm long, stem 1.8–2 mm diam, reddish green to purple (Fig 27). Leaves succulent, spirally attached, densely imbricate at proximal half and on young shoots, more widely spaced towards tip, sessile, semiaplexicaule, narrowly ovoid to subtriangular on young leaves, (6–) 8–12 mm long, 3–4 (–5) mm wide, 1.5–2.5 mm thick, blunt-subacute, upper side convex, lower side obscurely keeled, glaucous to dull green with minute reddish spots near base and where exposed, margins entire (Fig 28).

Inflorescence terminal, with three alternating cincinnoid branches, the distal two generally longer, 1.5–3 cm long, each bearing (2–) 3–5 flowers, proximal cincinnus 0.5–1.5 (–2.5) cm long, with 2–4 flowers, rachis 1.2–1.6 mm diam, light green with reddish to purple spots (Fig 29). Flowers 6–12 (–16), appearing from May to July, sessile. Flower buds 5–6 mm × 2.5–3 mm, reddish green with reddish dots, bracteoles ovate, 4–6 mm long, 1.8–2 mm wide, with a hyaline spur. Sepals ovate, blunt-subacute, (1.5–) 3.5–5 mm long, 1–2 mm wide. Petals oblong, acute-deltoid at tip, united at the base, folded outwards at the middle, 6–7 mm long extended, 1.8–2 mm wide, induplicate, outer surface white to light pink with a reddish keel, inner surface white to light pink with a central pink stripe, margins entire. Stamens ten, the five epipetalous 3–4 mm long, the antesepalous 5–6 mm long, filaments white to pink. Anthers ovoid, yellow, 0.5 × 0.3 mm. Gynoecium ovoid, 2.5 × 4 mm, carpels five, light green to reddish. Style 1 mm long, greenish white to light pink. Nectary scales yellow, 0.8 mm. Fruit: pentalocular, dehiscent, 4 × 7 mm. Seeds: narrowly ovoid to pyriform, 0.6–0.65 mm long, 0.23–0.26 mm diam, brownish orange (Fig 30).

PERU. Dept. Cajamarca, Prov. Cajamarca, Dist. Cajamarca. Road from Cajamarca to Cumbemayo, km 5, on mossy rocky wall along road, growing with *Peperomia nivalis* Miq., 7°10′16″ S, 78°31′35″ W, 2980 m, 2 May 2000, G. Pino 282. Road from Cajamarca to Gavilán on eroded rocky slope with shrubs, 2850 m, 3 July 1987, *I. Sánchez-Vega 4445*, (CPUN 2399) Dist. Baños del Inca: Otuzco Necropolis, on rocks of the ruins and in cracks, growing with *Peperomia nivalis*, 7°07′24″ S, 78°27′18″ W, 2850 m, 2 Oct 1999, *G. Pino 143* (USM 217,145). Purhuay, on rocks along the river banks, up to 30 cm high, 7°05′45″ S, 78°31′18″ W, 2836 m, 12 Jan 2006, *RRP 821* (USM 217,149). Dist. Llacanora: Callacpuma cave, on rocks of the path leading to the cave, 7°11′03″ S, 78°26′21″ W, 2700 m, 4 May 2000. *G. Pino 318* (USM 217,143). Cerro de Rumicocho, on slope 11 km away from the road, 2620 m, 25 Apr 1981. *J. Sánchez-Vega 3381*, (CPUN 2400) Dist. San Juan, road from Cajamarca to San Juan, km 145.5, in cracks of a rocky slope, growing with moss, *Peperomia andina* Pino, *Echeveria oreophila* Kimnach, 2370 m, 7°17′37″ S, 78°29′16″ W, 16 May 2001, *G. Pino 898* (USM 217,144). Footpath from

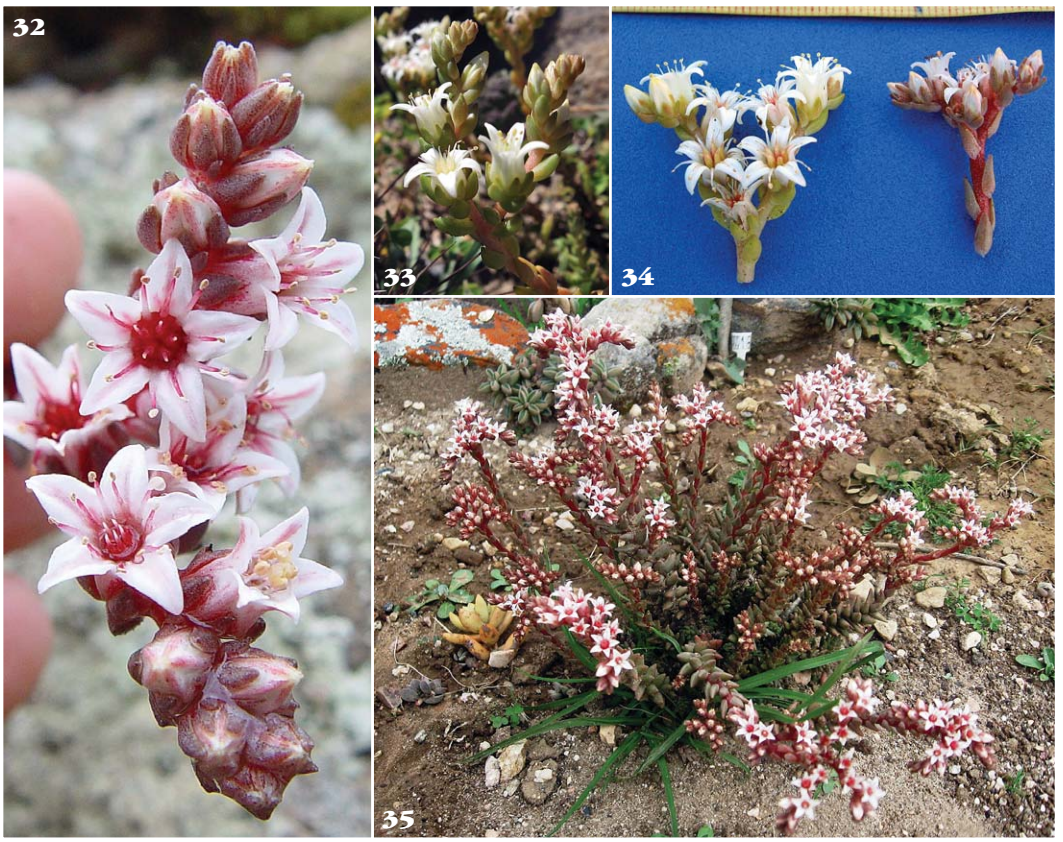


Figures 22–25. *Sedum decipiens*. Figure 22. *S. decipiens*, in habitat at San Juan. **Figure 23.** *S. decipiens*, ex-situ plant. Note the long, flexible stems. **Figure 24.** Young plantlet of *S. decipiens* in habitat near Magdalena **Figure 25.** Detail of mature inflorescence (left) and bud formation (right). Flowers have pure white petals born on loose scorpioid cincinni.

Yumagual to the Cajamarca-San Juan road, on rocks, growing with *Matucana fruticosa* Ritter. 3030 m, 7°14′11″ S, 78°31′19″ W, 7 Nov 2003, *G. Pino 1234*. Yumagual, on rocks, growing with *Peperomia andina* Pino and a whitish-flowered species of *Begonia*, 7°14′12″ S, 78°31′19″ W, 2890 m, 15 Jan 2006, *RRP 833* (USM 217,147). Dist. Jesús: road from Jesús to San José de Tuminá, on rocks, growing with *Peperomia cymbifolia* Pino and *P. andina* Pino, 2700 m, 23 Nov 1999, *G. Pino 198*. Jesús, 1 km south of the town, southeast of Cajamarca, 2550 m, 22 May 1994, *I. Sánchez-Vega 7190* (F 2216,147). Prov. Celendín, Dist. Sucre, between Cajamarca and Celendín, low shrubland, 2900 m, 25 Jun 1963, *R. Ferreyra 15,157* (USM 19,613). Prov. San Marcos, Dist. Eduardo Villanueva, La Grama, grayish leaves, growing with *Peperomia dolabriformis* Kunth var *multicaulis* Pino et Cieza, *Peperomia cymbifolia* Pino, *Lasiocereus rupicola* Ritter, *Matucana intertexta* Ritter, *Puya* sp, and *Deuterocohnia longipetala* Mez, 2156 m, 7°25′36″ S, 78°07′14″ W, 2156 m, 29 Jan 2007, *RRP 1055* (USM 217,148). Dist. Chancay: Between Chancay and the Valley of Condebamba, on slope, 2600 m, 6 May 1972, *I. Sánchez-Vega 952* (CPUN 2398). Dept. La Libertad, Prov. Otuzco, Dist. Salpo, Cerro de los Enamorados, 1 km N of Salpo, rocky slopes, growing with *Ephedra* sp, *Tagetes* sp, *Monnina* sp, and *Oxalis* sp, 3540 m, 8°00′02″ S, 78°36′23″ W, 6 May 2006, *P. Carrillo-Reyes*, *M. Chocce and S. Leiva 5173* (USM 210,582). Yamebamba, on very steep slopes, 2900 m, 13 Aug 1951, *A. López 0698* (USM 19,616). Prov. Santiago de Chuco, Dist. Mollebamba, El Castillo, between rocks, 3260 m, 22 June 1954, *A. López 1103* (USM 19,606).

This species was first noticed on the Huntington expedition to northern Peru in May 1984. Near its roots, *Peperomia dolabella* Rauh & Kimnach was discovered, and a photo of the *Sedum* was published in the article describing the new *Peperomia* (Rauh and Kimnach 1986). However, in that article, the *Sedum* was identified as *Villadia dielsii*. The latter was originally described in 1906 by Diels as *Cotyledon stricta*, transferred to *Altamiranoa* by Berger, and finally renamed as *Villadia dielsii* by Baehni and McBride because of a previous *Villadia stricta* described by Rose in 1905. When Thiede and 't Hart transferred it to *Sedum* they had to choose a new specific name, resulting in their publication of *Sedum plicatum*. We finally concluded that *S. plicatum* is a synonym of the earlier-described *Sedum decipiens* (Pino 2007).

Sedum isidorum and *S. decipiens* are very closely related, but *S. isidorum* is a smaller, more compact plant, its primary stem is generally

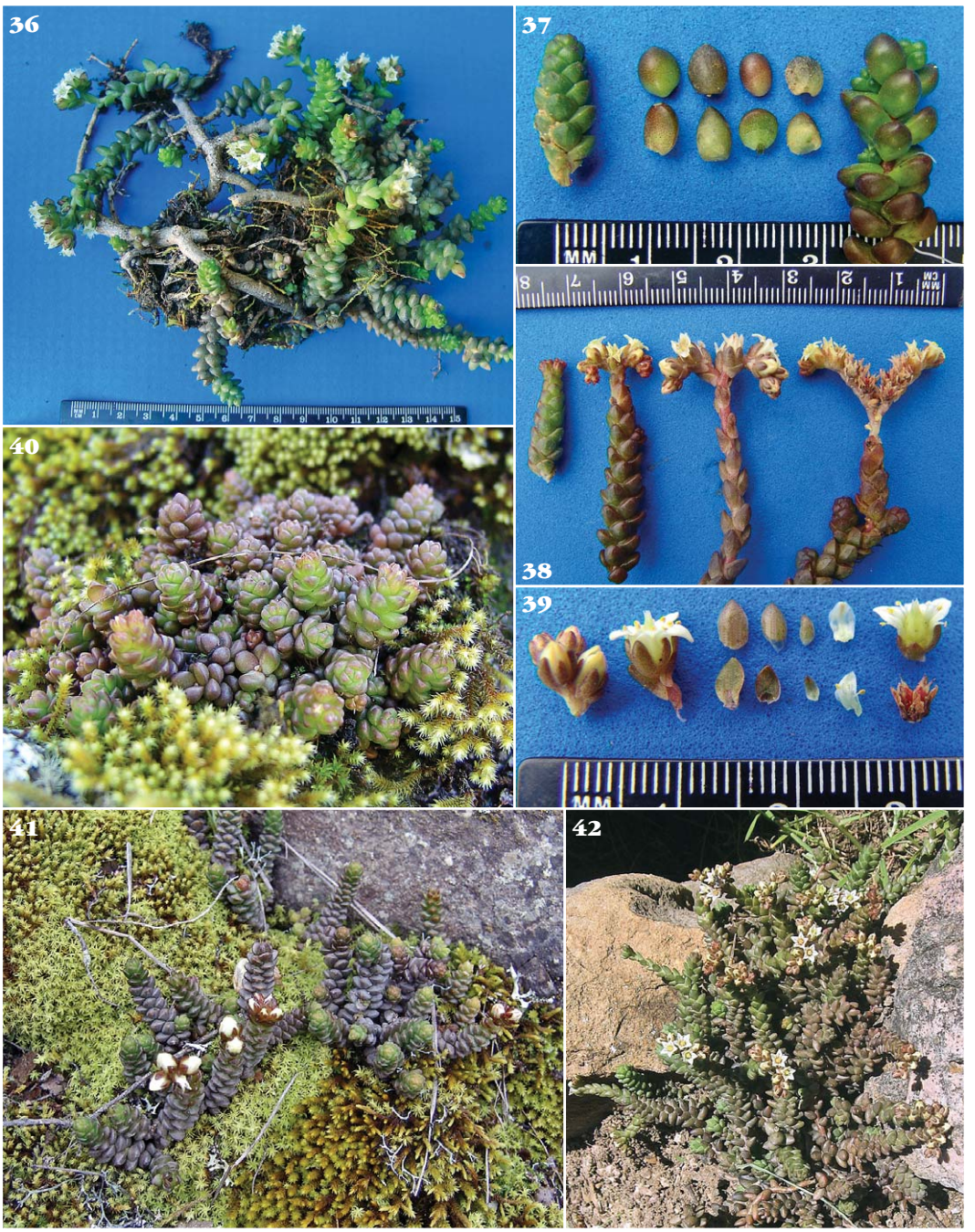


Figures 26–31 (facing page), 32–35. *Sedum isidorum*. Figure 26. *S. isidorum* in habitat at the type locality on the road from Cajamarca to Cumbemayo. **Figure 27.** *S. isidorum*, *ex situ* plant, note the erect, stiff stems. **Figure 28.** Detail of (left to right) stem with leaf implantation, leaves. **Figure 29.** *S. isidorum*, detail of inflorescence. **Figure 30.** Detail of (left) cincinnus; (above, left to right) flower section, bracts, flower with bracts; (below, left to right) petal-outer side, lateral view, sepals, fruit. **Figure 31.** *S. isidorum* in habitat before flowering, plants are very red and stiff at the end of the dry season. **Figure 32.** Inflorescence in habitat near Isidora Infante. **Figure 33.** Detail of a plant with whitish flowers. **Figure 34.** Two plants with large whitish flowers. **Figure 35.** A large pink-flowered *S. isidorum* cultivated at the Botanical Garden of San Marcos.

simple and can be much thicker, the branches are fewer, erect or slightly decumbent and stiff, in contrast to the loose, decumbent stems of *S. decipiens*. Although the leaves of *S. isidorum* are dull green to lightly glaucous, they have a reddish tinge where exposed to light, and the stems are sometimes contrastingly bright red (Fig 31), while S. *decipiens* has a consistently overall light-green color (Fig 23). Both species have inflorescences with alternate cincinnoid branches, but *S. decipiens* may have more than three branches, looser and curving, with pure white flowers, the petal margins sometimes undulate, the carpels green. By contrast, *S. isidorum* almost always has three branches, the distal ones larger and so close and compact as to resemble a dichasium. In bright light, flowers have petals that are frequently pinkish, and the carpels are red, with margins always straight (Fig 32), although some plants that thrive in cloudy locations have whitish petals and paler carpels (Figs 33, 34).

This new species is fairly common in the province of Cajamarca, and also San Marcos and Celendín, extending to the adjacent provinces of the Department of La Libertad. Its local name is "Chuqllu-chuqllu" (little corn). Flowers are sweet and are commonly eaten by children. It has not been observed in cultivation in Cajamarca, and many attempts to cultivate it in warm regions like Lima have failed because of the heat and aridity; it thrives in a mild climate and could then prove to be highly ornamental (Fig 35).

The name "isidorum" is a latinization of the Greek "*isidoron*," (from Ἴσις [Isis], the Greek name of the Egyptian goddess of fertility and maternity Aset or Iset, and δώρον [gift]). It honors two people: Dr Isidoro Sánchez-Vega, who also collected this plant and is founder



Figures 36–42. *Sedum reniforme.* **Figure 36.** *S. reniforme ex situ*, collected at the type locality near Hualgayoc. **Figure 37.** *S. reniforme*, detail: (left to right) young vegetative shoot, leaves, branch of cultivated plant. **Figure 38.** Detail of cymes (dichasia) of different length from different localities. **Figure 39.** Detail of (left to right): cincinnus, complete flower with bract, (above, left to right), bract outer side (2), sepal outer side, petal outer side, flower section. (below, left to right) bract inner side (2), sepal inner side, petal inner side, fruit. **Figure 40.** Young *S. reniforme* in habitat at Cumbemayo. Note the crowded broad leaves, very red at the end of the dry season. **Figure 41.** *S. reniforme* starting to bloom in habitat at Pamparomás, Ancash. **Figure 42.** Cultivated *S. reniforme* at the Botanical Garden of San Marcos.

and director of Herbarium CPUN, National University of Cajamarca, and my mother, Luisa Isidora Infante, the woman who brought me into this world and patiently accompanied me

more than twelve times to Cajamarca, land of our ancestors. Without her help, many species of Piperaceae and Crassulaceae would not have been found and described.

6. *Sedum reniforme*

Sedum reniforme (H.Jacobsen) Thiede & 't Hart. *Novon* 9(1): 125. 1999.

Holotype: Dept. Cajamarca, pr. Hualgayoc juxta praedium La Tahona in rupibus 2600 m flor m Maj. 1904 (Weberbauer, 04/4053, B).

Basionym: *Cotyledon imbricata* Diels in *Englers Bot Jahrbuch* 37: 411. 1906.

Synonyms: *Villadia reniformis* H.Jacobsen. *Nat Cact Succ J* 13: 76. 1958.

Villadia imbricata (Diels) Baehni & J.F.McBride, *Candollea* VII: 286, 1937. McBride. *Flora of Peru*. Vol III Part II No 3: 1013. 1938.

Altamiranoa imbricata (Diels) A.Berger in Engl and Prantl, *Pflanzenfam*. ed 2, 18a: 470. 1930.

A succulent glabrous herb, subcaespitose, forming mats to 15–20 cm diam, 7–10 (–15) cm tall (Fig 36). Stem procumbent at base, 1.8–2.5(–4) mm diam, 4–8 cm long, light gray-brownish, with 3–5 primary roots 4–5 cm long, 1–1.2 mm diam, secondary roots fibrous, densely attached to moss. Branches 20–50 or more, erect to slightly decumbent, 3–6 (–8) cm long, stem 0.9–1.2 (–2) mm diam, light green to reddish. Leaves succulent, sessile, spirally attached to stem, subtriangular when young, then broadly ovate, sometimes elliptical to rotundate in very rainy seasons, 3–6 mm long, 3.5–5 mm wide, 2–3 mm thick, subacute to obtuse, upper side flat to slightly convex, lower side very convex, obscurely keeled, both sides dull green with minute reddish dots, almost dark purple in very exposed plants, margins entire (Fig 37).

Inflorescence a terminal cyme (dichasium) with two cincinnoid branches 1.4–1.7 mm diam at base, 0.6–2 cm long, light green to reddish (Fig 38). Flowers 5–9 per cincinnus, sessile, in habitat appearing from May to June. Flower buds 3–3.5 × 2.5–3 mm, dark red. Bracteoles narrowly ovate, 2.5–6.5 mm long, 1.5–2.5 mm wide, subacute, dull green with reddish dots, upper side flat, lower side convex. Sepals narrowly ovate, 2–5 mm long, 1.2–2.2 mm wide, similar to bracteoles. Petals oblong, acute-deltoid at tip, united at the base, bending outward at the middle, 3.5–4.5 (–7) mm long, 2–2.5 mm wide, greenish white. Stamens ten, the five epipetalous 1.2–1.4 mm long, the antesepalous 1.5–1.7 mm long, filaments white. Anthers ovoid, yellow, 0.3 × 0.5 mm. Gynoecium ovoid, 2.1–2.5 × 2.5–3 mm. Carpels five, light green. Style 1–1.2 mm long, white, stigma white. Fruit 3.5 × 3.5 mm, carpels red. Seeds: narrowly ovoid, 0.55–0.65 mm long, 0.25–0.30 mm diam, brownish orange (Fig 39).

PERU. Dept. Cajamarca, Prov. Hualgayoc, Dist. Hualgayoc, "La Tahona Alta," road from Hualgayoc to Bambamarca, on 45° slopes, 100 m above the road., on soil among rocks growing with *Peperomia* sp aff *nivalis*, *Peperomia galioides* Kunth and *Echeveria eurychlamys* (Diels) A.Berger, 3180 m, 06°44′35″ S, 78°35′06″ W, 29 Apr 2007, *G. Pino 1709* (USM 217,140, type locality). Prov. Cajamarca, Dist. Cajamarca, Cumbemayo, on vertical rock walls growing with moss and *Peperomia hartwegiana* Miq., *Peperomia parvifolia* C DC, *Echeveria oreophila* Kimnach, 3610 m, 7°11′19″ S, 78°34′40″ W, 29 Apr 2007, *G. Pino 1711* (USM 217,139). Cumbemayo, on rocks with moss, large plants with white flowers, 7°11′04″ S, 78°32′30″ W, 3150 m, 22 Jan 2006, *RRP 847* (USM 217,141) (Fig 40). Dist. Baños del Inca: Purhuay, on rocks with moss, very compact plants, flowers greenish, 7°04′51″ S, 78°01′36″ W, 2914 m, 12 Jan 2006, *RRP 825* (USM 217,142). Dept. La Libertad, Prov. Santiago de Chuco, Dist. Santiago, Santiago–Shorayo road, 26 km from Santiago, 4000 m, 8°07′ S, 78°18′ W, 26 Aug 1982, *David Smith 2328* (USM 154,374). Dept. Ancash, Prov. Huaylas, Dist. Pamparomás, road from Cajabamba to Pamparomás, on rocks, with moss, 3400 m, 9°05′50″ S, 77°59′30″ W, 14 Apr 2006, *G. Pino 1663*. Prov. Yungay, Dist. Yungay, Umacchuco, km 18, road to Vaquería, crossing Huashao, rocky slope, 3410 m, 9°06′18″ S, 77°41′20″ W, 7 May 2006, *P. Carrillo-Reyes 5174* (USM 210,585). Huascarán National Park, Llanganuco sector, María Josefa Trail between Chinancocha and Pucayacu, *Polylepis sericea* woods and shrubland, 3850 m. 9°05′ S, 77°39′ W, 7 May 1985, *D. N. Smith 10,570*. (USM 68,957). Llanganuco, rocky slopes, 3800 m, 2 May 1961, *R. Ferreyra* 14,366 (USM 19,607). Prov. Carhuaz, Dist. Shilla, Quebrada Ulta, on road to Ulta pass, 4000 m, 9°07′ S, 77°32′ W, 29 July 1985, *D. N. Smith 11,400* (USM 70,104). Prov. Huaraz, Dist. Huaraz, San Jerónimo Bridge (formerly Calicanto) at Río Santa, on west-facing rocky banks of the river on a 60° slope, growing with *Peperomia nivalis*, *Peperomia* cf *verruculosa*, *Sedum decipiens*, *Portulaca* sp, 3080 m, 9°31′37″ S, 77°31′48″ W, 17 Apr 2006, *G. Pino 1674*. Prov. Bolognesi, Dist. Chiquián, 5 km (in a straight line) N