

AGAVE ATTENUATA SSP DENTATA (ROEZL) ULLRICH*

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Abstract: In 1860 Benedict Roezl discovered a plant in northwestern Guerrero, Mexico which he described as *Gbiesbreghtia dentata*. Specimens raised from seeds of his collection were known in Belgian gardens as “*Agave Gbiesbreghtii dentata*,” and Jacobi (1865) described them as *A. debaryana*. This is the oldest name for *A. pedunculifera*, described by Trelease (1920) and, as a comparison of the characters shows, this plant is nearly identical with *A. attenuata* SALM-DYCK (1834). A new combination is therefore made: *A. attenuata* SALM-DYCK ssp *dentata* (ROEZL) ULLRICH. The neotype is Rzedowski & McVaugh #289 (43 km W of Chilpancingo, Guerrero, 2000 m; 31.1.1965; ECBN isoneotype at MICH). In the future it may be possible to distinguish the northern populations along the Sinaloa-Durango border as subspecies *pedunculifera*.

Key words: Agavaceae, Littaea, Amolae

On 13 January 1860, the well known plant collector Benedict Roezl journeyed into the interior of Mexico. The route led him from Mexico City through Toluca and Zacualpan to Taxco, Guerrero, and from there via Tejulilco up to Huetamo in Michoacán. Towards the end of February, 1860, he reached the silver mine Espíritu Santo where he found, not far away, *Agave schidigera* LEMAIRE, later designated as a subspecies of *A. filifera* SALM-DYCK (1861). McVaugh (1952) writes of this location: “The famous mining camp of Espíritu Santo was at least 75 km southeast of Inguaran, west of Huetamo and north of Zirandaro, not far from Río Balsas.”

In March 1860 Roezl left Espíritu Santo for the south, crossed the Río Balsas and, for the next month, explored the deserted, forested region of northwestern Guerrero. Roezl (1861) writes:

From here [an isolated Indian hut] I made a lateral excursion to several mountains and was amply rewarded finding a magnificent plant that I had just seen at the Volcán Jorullo (Michoacán) but that I was unable to collect because it grew on inaccessible cliffs. It seems to be a new genus closely allied to *Littaea* [Agave subgenus *Littaea*] but very different; I named it *Gbiesbreghtia mollis* in honor of my friend and colleague, Gbiesbreght, who has achieved so much in the exploration of the Mexican flora. Seen from a distance, it is similar in habit to an agave but the resemblance lessens as one approaches. The leaves become 4–5 feet long and 6 inches broad, they are very soft and absolutely without spines, the inflorescence is 12–20 feet high, without lateral branches, the upper half is recurving and covered with thousands of light-green flowers with very long, exerted, violet filaments. This

very beautiful, decorative plant was very common here on all cliffs, but since most of the specimens were in flower or growing in inaccessible places, we searched a whole day without success until we finally found a single plant with abundant ripe seeds.

The reported lengths of the leaves appear to be somewhat long (1.2–1.5 m); however, the recurving inflorescence and the soft, spineless leaves leave no doubt that Roezl’s *Gbiesbreghtia mollis* is identical to the well known *Agave attenuata*. It is not known precisely where Roezl found this plant, but some two days later he reached the mine “Guadalupe.”

Alvarez and Duran (1856) list a mine, Guadalupe Coahuayutly, for Guerrero and describe the route from Tixtla, the former capital of the state, via “Axuchitlan” (= Ajuchitlan del Progreso) and “Coaguayutly” (= Mineral de Guadalupe de Coahuajutla) to Zacatula at the border to Michoacán, at the Pacific. Perhaps this is the present village of Coahuayutla de Guerrero in northwestern Guerrero (with tentative coordinates 18°16′ N, 101°27′ W).

However, two days later Roezl left that village and returned “over the Cordillera again but in another direction and through different areas than on the way here.” He further explains: “During the third day [after Guadalupe] we passed a low forest, where *Laelia acuminata* grew in immense masses; I took from these as much as I could. Soon I discovered a second species of my genus *Gbiesbreghtia*, which I name, because of its dentate leaves, *Gbiesbreghtia dentata*, and which is just as beautiful as the previously mentioned species. Unfortunately I could collect only very few seeds, for although it was growing here in great abundance, it grew profusely on vertical cliffs.” After eleven days Roezl reached the Cerro Barabas near Zirandaro at the Río Balsas.

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From there the route led him over Coyuca and Ajuchitlan to Tlacotepec. His report ends with a receipt of a passport for the continued journey to Acapulco.

Plants raised from seed of Roezl's *Gbiesbreghtia mollis* and *G. dentata* existed for years at the Belgian collections as *Agave gbiesbreghtii mollis* and *A. gbiesbreghtii dentata*. The greatest expert on agaves in the 19th century, Georg Albano von Jacobi (1868), published both of these as *A. debaryana* "...which differs from *A. attenuata* in its lower stem, the much lower, more regularly symmetrical, funnel-shaped crown of leaves and the serrulate armature of the leaves.

Indeed, *A. gbiesbreghtii* KOCH belongs to section Pericamtagave BERGER subgenus Littaea and has no resemblance to *A. debaryana* JACOBI. Jacobi (1868) placed this species close to his *A. kellockii*, as well as *A. pruinosa* LEMAIRE, recently diagnosed by him. The latter probably did not originate from

the same collection as Roezl's *Gbiesbreghtia dentata*, since according to Jacobi's description (1885), its leaves were 45 cm long, indicating an older specimen, assuming that leaves only get smaller before the plant begins to flower. *A. kellockii* was named in honor of Dr Kellock of London, who introduced it from an unrecorded source. Judging from the chronology, this plant could be a descendant of Roezl's collection.

Baker (1877) treats *A. debaryana* and *A. kellockii* as synonyms of *A. pruinosa* and remarks: "It is a very distinct plant, resembling only *A. attenuata*, from which it differs by its serrulate margin." Baker placed this taxon in his monotypic group within Agave, Serrulatae. Terracciano (1885) agreed with Baker but asked critically: "Is it [*A. pruinosa*] a variety or a species? It comes very close to my var *serrulata*." He presents a drawing of his new *A. attenuata* var *serrulata*. Berger (1915) accepted the same synonymy for *A.*

pruinosa, raised *A. attenuata* var *compacta* JACOBI to species level, naming it *A. cernua*, and published a new combination, *A. cernua* var *serrulata* (TERR.) BERGER.

From an herbarium specimen collected by J. N. Rose near Colomas, Sinaloa, Trelease (1920) published *A. pedunculifera*: "Habit?; leaves 12-15 cm wide, 65 cm long, thin, glaucous, oblanceolate, acuminate, with a dull red-brown, needle-shaped spine 2 mm wide and 15 mm long, the margin with minute denticles about 2 mm apart; inflorescence small, the pedicels clustered on short slender forking peduncles, 15-20 mm long; capsules fusiform, 5-8 mm broad; seeds dull, very small, 2 mm wide, 2.5 mm long."

Breitung (1961) did not mention this species but placed *A. pruinosa* as a synonym of *A. ellemeetiana* KOCH. Gentry (1982), 60 years later, took up Trelease's species and comments "Agave *pedunculifera* is closely related to *A. attenuata*, as expressed in both leaf and flower. However, the single nearly stemless plant habit is a basic enduring characteristic throughout the populations observed.... *A. pedunculifera* shows considerable variability in leaf form and very short tubes (2 mm) in the Arcelia (Guerrero) population in the

Figure 1. *Agave attenuata* ssp *dentata* on a shady cliff about 20 km SW of Puntequilla, 2000 m, Michoacan, (BU #047); 19 November 1987.





Figure 2. *Agave attenuata* ssp. *dentata* along the Durango-Mazatlan highway, at about km 210. Photo by Alfred B Lau, August 1983.

southern limits of range along the Río Balsas contrast strongly with the small plants with relatively deep tubes (6 mm) in its northern limits on the cliffs of the Sierra Tacuichamona in central Sinaloa. These two extremes, however, are linked by intermediate variants in Jalisco.”

Gentry comments, “*A. attenuata* var *serrulata* with serrulate denticulate leaf margins, as a homologous variant, appears to have more taxonomic use [than *A. cernua*]. *A. pruinosa* appears

to be a serrulate-leaved form of *A. attenuata* and is probably equivalent to Terracciano’s variety.”

A. attenuata is one of the most distinct and decorative species of the whole genus, common in European collections and gardens. These plants show only relatively minor variations under comparable culture, and most are probably of the same clone. The first specimens growing in Europe, at Kew, were described by Hooker (1862) as *A. glaucescens*. The accompanying

Table 1. Characteristics (following Gentry 1982) of *Agave attenuata* and *Agave pedunculifera*.

Characteristics	<i>Agave attenuata</i> SALM-DYCK	<i>Agave pedunculifera</i> TREL.
leaves (L × W)	50-70 × 12-16 cm	50-70 × 15-18 cm or 80-90 × 11-15 cm
color	light glaucous gray or pale yellowish green	pale green to glaucous white
marginal teeth (L)	margin smooth or serrulate	0.5-2 mm
spine (L)	absent	weak, acicular, 10 mm
inflorescence (L)	2-3.5 m, mostly recurving	2-3 m, erect or recurving (on cliffs)
flowers (L)	35-50 mm	37-52 mm
ovary (L)	15-25 mm	20-27 mm
tube (L)	3-5 mm	2-6 mm
tepals (L × W)	16-24 × 5 mm	12-22 × 5-6 mm
filaments (L)	35-45 mm	30-35 mm
anthers (L)	15-20 mm	14-22 mm
pedicels (L)	short, flowers to 3-8	2-3 cm, flowers to 2 or 4
capsule (L × W)	20-30 × 10 mm	15-20 mm
seed (L × W)	3-3.5 × 2-2.5 mm	2.5 × 2 mm (Trelease, 1920)



Figure 3. *Agave attenuata* ssp. *dentata* on the Durango-Mazatlan highway at about km 193; Photo by Ernst Wölfling, 19 January 1991. **Figures 4, 5.** *Agave attenuata* ssp. *dentata* over the Presa de Infiernillo about 42 km south of Nueva Italia, Michoacan, (BU #052); 21 November 1987. **Figure 6.** Plant of the complex of *Agave attenuata* (?) photographed by Alfred Lau in 1990 near Jalapa de Diaz, Oaxaca—over 300 km east of the heretofore easternmost known population.

fine plate (5333) of Curtis' Botanical Magazine was selected by Gentry (1982) as the neotype for *A. attenuata*. On the other hand, *A. pedunculifera* is nearly unknown in Europe, a fact explained by its single rosette and the absence of inflorescence bulbils.

The comparison of both taxa in Table 1 shows:

1. The flower measurements are very similar.
2. Gentry describes the leaf margins of *A. attenuata* as "smooth or serrulate," but all specimens in Europe that I have seen have had smooth margins. It is questionable whether Gentry really saw plants with serrulate margins in the field or whether he cites this characteristic only in a formal way, since he includes *A. pruinosa* in his synonymy.

3. Gentry describes the inflorescence of *A. pedunculifera* as "erect or recurving (on cliffs)." Most of the known illustrations of *A. attenuata* show a recurved spike (Brietung 1961; Hooker 1862; Henriques 1887; Anon. 1895; Finckh 1897; Rose 1900; Cockburn 1903; Szabó 1903; Watson 1909; Trelease 1914; Catalano 1932; Anon. 1935; Simonet 1938; Otte 1943; Clarkson 1948; Jacobsen 1954; Jacobsen and others 1956; Wrobel-Sterminska 1972; Huxley & Huxley 1980; Bramwell & Bramwell 1984; Ullrich 1990a). But there are some illustrations of *A. attenuata* with an erect inflorescence (Houllet 1876; Rose 1897, 1898; Scherer 1930; Däniker 1935; Kabel 1950; Riviere 1955).

4. The reported stem length of *A. attenuata* is very variable. Published values include 0.9–1.2 m (Hooker 1862), 1.5 m (Cockburn 1903), 1–2 m (Däniker 1935), 1.2 m (Rose 1898), 2 m (Houllet 1876) and 3 m (Kable 1950). Contrary to those specimens cultivated in greenhouses, the plant portrayed by

Watson (1909) growing outdoors in Sydney, Australia, has an obviously shorter stem, as well as the *A. attenuata* cultivated at Lanzarote, Canary Islands (Bramwell and Bramwell 1984). Maturation time is different also: one anonymous author (1935) gives 80 years, but Watson (1909) says 23 years. It is known that agaves, depending on their culture or environmental conditions, develop vary different habits (Ullrich 1990b), including more or less longer stems during their different ages. McVaugh (1989) in his *Flora Novo-Galiciana* remarks critically: "Because it [*A. attenuata*] is distinguished from *A. pedunculifera* chiefly by its habit of developing stems below the foliar rosette, its association with that species on the Sierra Manantlán (Jalisco) seems to deserve further investigation." Indeed, on 19 November 1987, the author saw at ca. 20 km southwest of Puntecilla, Michoacan, a small colony of *A. pedunculifera* with denticulate and spiny leaf margins (BU #047) on a cliff strongly shaded by trees, with stems up to 1.5 m long (Fig 1).

5. Trelease (1920) named his *A. pedunculifera* for its "short, slender forking pedicel, 15–20 mm long," while he describes the pedicels of *A. attenuata* as short (illustrated in Houliet 1876, Anon. 1895 and Däniker 1935).

Regarding the obviously near relationship of *A. attenuata* with *A. pedunculifera*, with characters that are variable and partially overlapping, I consider it reasonable to combine both taxa, as promised in a previous paper (Ullrich 1990a).

As this contribution demonstrates, the oldest name for *A. pedunculifera* is Roehl's *Gbiesbreghtia dentata*. Richard and Galeotti (1845) published the genus *Gbiesbreghtia* in the Orchidaceae, as later did Gray (1873) in the Scrophulariaceae. But according to Art. 68.1 of the ICBN the name *dentata* is to be taken up because of pri-



Figure 7. Hybrid of *Agave attenuata* spp *attenuata* crossed with *Agave shawii* ssp *shawii* photographed by Ernst Wölfling at the Huntington Botanical Garden, 14 February 1987. **Figure 8.** *Agave attenuata* ssp *dentata* photographed about 10 km west of Arcelia (400 m). Guerrero, Mexico, by the author 15 December 1993.



Figure 9. View from the highway to a cliff where *Agave attenuata* ssp *dentata* is growing as a band of countless, never suckering, individual rosettes that stretches for many kilometers.

ority. Nevertheless, the epithet “pedunculifera” could be used at the rank of subspecies, since a name in no case has priority outside of its own rank (art. 60.1, ICBN). But such a procedure would not respect history. Benedict Roezl discovered the plant in 1860 in northwestern Guerrero, and described it because of its denticulate leaves, as *Gbiesbreghtia dentata*. He sent seeds to Europe, where the species was described as *Agave debaryana* (Jacobi 1868). For that reason, the following new combination is given here:

***Agave attenuata* SALM-DYCK ssp *dentata* (ROEZL) ULLRICH, comb. & stat. nov.**

Basionym: *Gbiesbreghtia dentata* ROEZL, *Gartenflora* 10 (4): 123, IV. 1861

Neotypus: MEX, Guerrero, Mun. Chichihualco, Cruz de Ocote, 43 km W Chilpancingo, 2000 m; *Rzedowski & McVaugh* #289; 31.I.1965; ENCB, isotype in MICH.

A. pruinosa LEMAIRE EX JACOBI, *Hamburger Gart. Blum. Ztg.* 21 (10) = 499, X.1965.

A. debaryana JACOBI, *Abb. Schles. Ges. Vaterl. Cult. Jabresber.* 45 “1867”: 1868.

A. gbiesbreghtii dentata HORT. BELG. EX JACOBI, pro. syn., *Abb. Schles., Gas. Vaterl. Cult. (Abt. Naturw. Med.)* “1868/69”: “164” (= 174), 1869.

A. kellockii JACOBI, *Abb. Schles. Ges. Vaterl. Cult. (Abt. Naturw. Med.)* “1868/69”: “165” (-175), 1969.

A. attenuata dentata VERSCHAFFELT, Verschaffelt J: *Cat. Pl. Etabl. Hort. J. N. Verschaffelt* #19: 83; Gand, 1976.

A. dentata HORT. EX BAKER, pro. syn., *Gard. Chron.* (Ser. 2) 8 (207): 748, 15.XII.1877.

A. attenuata SALM-DYCK var *subdentata* CELS EX CARRIERE, *Rev. Hort.* 51(1): 28, 1, I. 1879.

A. attenuata SALM-DYCK var *serrulata* TERRACCIANO, Terracciano A: *Prim. Contr. Monogr. Agave:* 21+ pl. 4 (1), VI. 1885.

A. cernua BERGER var *serrulata* (TERRACCIANO) BERGER, Berger A: *Agaven:* 123, 1915.

A. pedunculifera TRELEASE, *Contr. US Natl. Herb.* 32 (1): 134, 11.X.1920.

In the auction catalog of the famous private library of Prince Salm-Dyck, held at Colonia, 14 September 1992, the author inspected #19 of Verschaffelt (1876), where on page 83 was given the combination “*Agave attenuata dentata*” with a short diagnosis. Following Art. 35.3, ICBN, this is to be considered as a variety. Specimens of this plant were offered for 500 francs, an incredibly high price.

It would be possible to construct a direct connection between both taxa if the type of *A. pedunculifera* were to be selected as the neotype for *A. attenuata* ssp *dentata*. The documented population west of Arcelia, Guerrero, is the nearest to Roezl’s location, but there are obvious differences between the relatively long narrow leaves (80 × 11–15 cm) of these plants (leaf index = 0.14–0.17) and the specimen described by Jacobi as *A. debaryana* (leaf index = 0.27). Following Roezl’s report, the location of *Gbiesbreghtia dentata* would probably be in the higher regions of the Sierra Madre. To the

contrary, the population near Arcelia lives only 500 m above sea level. Therefore, the collection of Rzedowski and McVaugh is selected as the neotype of *A. attenuata* ssp *dentata*. This opens the possibility of distinguishing the northern populations along the Sinaloa-Durango border as “ssp *pedunculifera*” if further field studies should indicate such a separation.

The oldest locations for ssp *attenuata* are given by Roezl (1862) as Volcán Jorullo, Michoacán, as well as northwestern Guerrero. Roezl (1880) adds Volcán de Colima: “We climbed a crest of 2000 m.... we pitched our camp under a huge oak whose branches were wholly covered with moss, in which many agaves had rooted. There were two species found in really conspicuous specimens on the trees, namely *Agave attenuata* and a species nearly allied with the common *Agave americana*.” Matuda (1960, 1961) gives the Barranca de Ixtapantongo and the Barranca de Nanchititla, Mexico, as new locations. He also cites the Barranca de Venados, Hidalgo, but this relates most probably to *A. mitis* var *albidior* (SALM-DYCK) ULLRICH, of section Anacamptagave BERGER (Ullrich 1993). Breitung (1961) cites Mil Cumbres, Michoacán, as a further locality for ssp *attenuata*, as Gentry made a collection there in 1951. Photos of this best-known of the populations are given by Huxley & Huxley (1980) and Ullrich (1990a).

The collection Kimmach & Boutin 3019 (Sierra Manantlán, Jalisco, 2000 m; I.1970), has been offered (ISI #1442; Anon. 1984) as *A. attenuata* ‘var nov.’ The inflorescence of this population is said to be erect and the leaves of a “striking blue coloration, far different from the commonly grown greenish-gray form.” Myron Kimmach (in a letter dated 6 January 1993) informed the author: “A few of the wild plants of this locality were green, not blue.” Gentry (1982) places it under *A. attenuata* and considers this species to be relatively rare in nature: “It favors the high rocky outcrops in pine forest between 1900 and 2500 m, where it forms small widely scattered colonies.” Though lacking armature, they grow on inaccessible cliffs and are thus protected from feeding enemies. Since such small stands are rarely seen from roads, one can assume the *A. attenuata* ssp *attenuata* is likely growing at other locations still undiscovered.

A. attenuata ssp *dentata* grows, according to Roezl (1861), in northwestern Guerrero as well as west of Arcelia and west of Chilpancingo (Gentry 1982). The given location, “La Salada, Michoacán” (Nelson 6823; 15–22.III.1903), could not be verified on maps available to the author. The population in Nayarit is (McVaugh 1989) a sight-record by Gentry south of Ocotillo. The closest collection in Sinaloa is Rose 1713 (Colomas; 16.VII.1897), the type for *A. pedunculifera*. The northernmost-known population until now is on Sierra Tacuichamona (Gentry 5692; 19.II.1940), whose vegetation Gentry (1946) discussed. A large population is traversed by Highway 40 from Durango to Mazatlán (Figs 2, 3),

east of the Sinaloa-Durango border. Photos made along this road are shown by Matuda (1964) and by Glass and Foster (1985). The author collected this taxon about 20 km southwest of Puntecilla in Michoacán, near Highway 37 (BU #052; 21.XI.1987), about 38 km SSE of the junction with highway 120 (Figs 4, 5). A photo by AB Lau near Jalapa de Diaz, Oaxaca, cannot be determined with certainty, but it is remarkable to see this plant some 300 km east of the (until now) easternmost-known location. This may be *A. ellemeetiana* KOCH, which until now has been known only from cultivation and which resembles ssp *pedunculifera* in habit.

A. attenuata is so distinct in appearance that its author (Salm-Dyck 1861) commented “I’m hardly able to believe it’s an agave.” Experience has shown that nearly any agave can be crossed with another. Carriere (1879) reports an artificial hybrid between *A. attenuata subdentata* and *A. xylonacantha* SALM-DYCK, which was named *A. attenuantba*. A cross with *A. verschaffeltii* LEMAIRE (= *A. potatorum* ZUCCARINI) is called *A. guignardii* HORT (Trelease 1914). A curious hybrid (ISI 2005–6. *Agave* ‘Blue Flame’) of *A. attenuata* with *A. shawii* ENGELMANN (Fig 7) was photographed by Ernst Wölfling in the Huntington Botanical garden, San Marino, California, in February 1987. This remarkable cross was made by Dave Verity of the University of California Botanical Garden, Los Angeles (M Kimmach in a letter dated 6 January 1993).

The following synonymy is given for the subspecies *attenuata*:

Agave attenuata ssp *attenuata* SALM-DYCK, *Hortus Dyckensis*: 303, 1834.

NEOTYPE: *Curtis’ Bot. Mag.* 88: pl. 5333 (*A. glaucescens* HOOKER), selected by Gentry, *Agaves Cont. N. Am.*: 68, 1982.

Gbiesbreghtia mollis ROEZL, *Gartenflora* 10(4): 122, IV.1861.

A. glaucescens HOOKER, *Curtis’s Bot. Mag.* 88: pl. 5333, I.I.1862.

A. attenuata var *compacta* JACOBI, *Hamburger Gart. Blum. Zeit.* (??) 21(10): 457, X. 1865.

A. attenuata var *subundulata* JACOBI, *Hamburger Gart. Blum. Zeit.* 22(6): 273, VI. 1866.

A. attenuata var *coarctata* JACOBI, nom. nud., ibid.

A. gbiesbreghtii mollis HORT EX JACOBI, pro. syn., ibid.

A. attenuata var *elliptica* JACOBI, nom. nud. *Abh. Schles. Ges. Vaterl. Cult. Jabresber.* 45 “1867”: 74, 1868.

A. spectabilis ROEZL EX BAKER, pro. syn., *Gard. Chron.* (Ser. 2) 8(207): 748, 15.XII.1877.

A. attenuata var *glauca* CARRIERE, pro. syn., *Rev. Hort.* 51(1): 28, I.I.1879.

A. attenuata var *latifolia* SALM-DYCK EX TERRACCIANO, Terracciano, *A. Prim. Contr. Monogr. Agave*: 21, VI.1885.

A. attenuata var *brevifolia* JACOBI EX TERRACCIANO, nom. nud., ibid.

- A. *attenuata* var *paucibracteata* TRELEASE, in Bailey LH. *Stand. Cyclop. Hort.*, vol 1: 235, 25.III.1914.
- A. *cernua* var *cernua*, Bergre A. *Agaven*: 122, 1915.

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