



Fig. 1 *Agave nizandensis* in habitat on a steep slope at Nizanda, Oaxaca, Mexico, 23 February, 2016 (Photo: John Trager)

***Agave nizandensis* – a unique dwarf Mexican species**

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Agave nizandensis is an attractive but unusual species with brittle leaves more closely resembling those of an *Aloe*. It is described and illustrated here in habitat at Nizanda, Oaxaca. In cultivation it has proved to be tricky to grow but with perseverance after 22 years a plant has finally flowered for this author. Photos by the author and John Trager.

History, habitat and distribution

Agave nizandensis was discovered in February 1947 by the intrepid Mexican plant explorer Tom MacDougall and Ladislaus Cutak, horticulturalist at the Missouri Botanical Garden, St Louis. At Nizanda in Oaxaca, Mexico, they observed two agaves. Cutak (1951) wrote that “A second maguey...caught my immediate fancy for it formed dense mats and looked like it might make an excellent pot plant. It was definitely different from all

the Agaves of my acquaintance. Some ten leaves appear in a very loose spreading rosette and the lower ones are practically flat against the ground, while the rest are more or less horizontal... A few small plants were collected and despatched to St. Louis for more careful study.” One of these plants flowered just over four years later and was named *A. nizandensis* Cutak after its type locality (Cutak, 1951) where it grows “in crevices and pockets of rocks on steep slopes” at Nizanda. John



Fig. 2 *Agave nizamensis* in habitat at Nizanda (Photo: John Trager)

Trager of the Huntington Botanical Garden in San Marino, California, revisited this locality in 2016 where Figs. 1 & 2 were taken.

This species was reintroduced into cultivation (MacDougall, 1960) being offered for sale by the International Succulent Institute and distributed as ISI-180, “grown from seed collected in 1958 by T. MacDougall at the type locality” (Anon, 1960). It seems likely that most plants in cultivation have originated from this distribution.

MacDougall (in Breitung, 1960) wrote that “In the wild it (*Agave nizamensis*) appears to be of limited distribution and although I have known the plant for more than 20 years, my records show only three native habitat localities, viz.: Sto. Domingo Petapa, San Miguel Chimalapa and Nizanda. All three localities are in the Oaxaca section of the Isthmus of Tehuantepec and vary from about 30 miles (in direct lines) one from the other. Habitat altitudes are between 170 and 340m.” This species, then, is a very narrow endemic, restricted to the Isthmus of Tehuantepec, southern Oaxaca.

***Agave nizamensis* in cultivation**

I have been growing this attractive species for around 22 years during which time I have found it somewhat tricky to grow compared to the 100+ other species and cultivars that I have been growing for 30 years. However,



Fig. 3 My largest specimen of *A. nizamensis* in a 25cm diameter pan, showing the leaf median stripes and small marginal teeth



Fig. 4 Stressed plant of *A. nizamensis*

since I moved to Scotland just over five years ago an aim has been to grow at least one plant well enough to get it to flower. My efforts were rewarded by a single flowering event in 2022.

My current largest specimen spreads about 50cm in diameter (leaf tip to leaf tip) in a 25cm-diameter pan (Fig. 3). It offsets by sending out short stolons to form modest-sized loosely-arranged clumps but mature rosettes could be described as stemless. The relatively long, narrow leaves are mid-green with pale median stripes, up to 34cm long and 3cm wide near the base, bearing very short teeth on the margins. The leaves are slightly concave on the upper surface but prominently rounded on the lower surface, being relatively thick and fleshy. However, the feature that distinguishes this species from most other agaves is the lack of strong fibres in the leaves. In contrast, agaves are renowned for having exceptionally tough leaves that are difficult to break and remove from the plant. Indeed, one species, *Agave sisalana*, is grown commercially as the source of the natural fibre sisal. The leaves of *A. nizamensis* are remarkably soft, brittle and very easily damaged, so plants need to be grown in places where the leaves will not be broken accidentally. Overall, non-flowering



Fig. 5 Start of flowering of *A. nizamensis* on 4 August 2022. Plant 40cm diameter in an 18cm diameter pot

plants of this species look more like aloes than agaves.

Over the years I have struggled to grow plants well which has been frustrating because this is a relatively small-growing *Agave* which, one would imagine, should be relatively easy to flower. Plants have either grown slowly, turned dark purple and stopped growing altogether (Fig. 4) or grown lushly. I had six specimens, so three years ago I set out to encourage at least one to flower. These plants were placed in various positions in the greenhouse or conservatory with different light and temperature regimes. Early in August 2022 I was surprisingly rewarded when one plant came into flower (Fig. 5) in a moderately shaded area of a greenhouse. I believe that this species is particularly sensitive to the light conditions and requires partial shade for optimal growth.

The plant that has flowered is not my largest, being only 40cm diameter in an 18cm diameter pan (Fig. 5). I suggest therefore that plant size is not a major factor in stimulating flowering in this species. On 4 August 2022 I was delighted to find it starting to flower. Over several weeks from August to October I recorded the height of the inflorescence (Table 1). Growth rate varied during this period: initially this averaged

Table 1 Growth of the inflorescence of *A. nizamensis*

| Date (2022) | Height (cm) |
|-------------|-------------|
| 4/8 | 5 |
| 15/8 | 42 |
| 19/8 | 59 |
| 21/8 | 62 |
| 22/8 | 64 |
| 23/8 | 68 |
| 24/8 | 71 |
| 26/8 | 77 |
| 28/8 | 84 |
| 29/8 | 86 |
| 30/8 | 88 |
| 1/9 | 100 |
| 4/9 | 102 |
| 6/9 | 107 |
| 7/9 | 109 |
| 10/9 | 113 |
| 23/9 | 119 |
| 10/10 | 120 |



Fig. 6 Inflorescence of *A. nizamensis* on 15 August 2022, 42cm tall

3.5cm per day with the maximum rate recorded being 4cm per day, reaching a height of 42cm 11 days after the start of flowering (Fig. 6). This growth rate is reasonably impressive but other species of *Agave* that I have flowered have had flower spikes that grew 10cm per day. For *A. nizamensis* the final height achieved by my single specimen was 1.2m with the inflorescence being relatively slender and only 1cm diameter at the base. Another significant feature of the flowering of *A. nizamensis* is that the inflorescence is remarkably sparsely flowered: my single specimen produced only 32 flowers. In contrast flower spikes of other agaves have been recorded as carrying up to 2–3,000 flowers. Individual flowers are pale yellow-green and

up to 6cm long including the exerted anthers arranged in clusters of 2–4 flowers (Fig. 7). Since the flowering plant has already produced five offsets it will not die.

Some other growers have been more successful in flowering this species much faster than I have achieved. For Cutak (1951) a plant took a mere four or so years to flower at the Missouri Botanical Garden in St Louis. Keen (1971) flowered a single rosette “after growing and enjoying the plant for some years” but he did not state exactly how many years it took. Breitung (1960) shows a plant in flower in the collection of J Marnier-Lapostolle in France but does not state how long it took to flower, although the maximum time between introduction and flowering must be no more than 13 years (time from first collection to Breitung’s article). MacDougall (1960) records it flowering regularly at the New York Botanical Garden. In contrast, no flowering plants are illustrated by Boeuf *et al.* (2017), Gentry (1982), Heller (2006), Lamb & Lamb (1963), Pilbeam (2013), Spath & Moore (2021), Thiede (2020) or Ullrich (1991), suggesting that flowering is not a commonly occurring event either in cultivation or in habitat. This view is supported by John Trager who tells me that at the Huntington Botanical Garden this species grows well but is not the freest of flowering agaves, even in such a suitable growing environment as California.

Relatives of *Agave nizamensis*

As indicated above, *A. nizamensis* is a most unusual species with *Aloe*-like leaves and rosettes. Cutak (1951), when describing his new species, did not suggest any close relatives.

Gentry (1982) in his monumental monograph of North American agaves, said that “the taxonomic position of this distinct species is anomalous. It has no close relatives and does not fit into any section or group.” Despite this, he placed it in his informal group *Amolae* in *Agave* subgenus *Littaea*, because it has unbranched spike-like (spicate) inflorescences and smooth, soft, pliant leaves. Its unique features prompted Ullrich (1991) to place this species in the new monotypic Series



Fig. 7 Close-up of the flowers and buds of *A. nizandensis*

Nizandensae Ullrich (= Section *Nizandensae* (Ullrich) Ullrich), a classification not adopted by any subsequent commentators. The species is now placed in Section *Inermes* Salm-Dyck, the current correct name for what Gentry called *Amolae* (Thiede, 2020). Here its apparent close relatives are species with soft, relatively non-fibrous leaves such as *Agave attenuata*, *A. ocahui* and *A. vilmoriniana*.

In the most recently published molecular family tree for *Agave* (Jiménez-Barron *et al.*, 2020), *A. nizandensis* belongs to one large, closely interrelated branch (clade) containing many species in which the resolution of their relationships is not currently clear. This study therefore provides no further clarity in terms of the closest relatives of the species under consideration here.

Finally, it is worthy of note that a hybrid involving this species has been recorded in cultivation: *A. nizandensis* × *A. falcata* (Glass, 1983).

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