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Echinomastus johnsonii (Parry ex Engelm.) E M Baxter

Zlatko Janeba

A close look at one of the choicest cacti of USA, its diversity, and its place in the wider scheme of things. Photography by the author, except where stated.

E*chinomastus johnsonii* (Johnson's Pineapple Cactus) is one of the most beautiful cacti of the Mohave Desert. It is a classic cactus with its heavy armature of strong, colourful spines completely covering the plant body, but most noteworthy for its outstanding large, bicoloured flowers. Because of its appearance, it has acquired several other vernacular names, such as the Beehive Cactus, Mojave Pineapple Cactus, Pink Viznagita and Johnson's Devil-claw, and on account of its smaller size compared with other barrel cacti of the genera *Echinocactus* and *Ferocactus*, it is also sometimes called the Pygmy Barrel Cactus.

Sometimes it is not easy to follow and respond quickly to the never-ending taxonomic changes of professional botanists. I, and the majority of other cactus growers, tend to apply the scientific name *Echinomastus johnsonii* to this plant, created by Baxter in 1935. It was originally described as an *Echinocactus*, a long time ago, by Parry and Engelman in 1871, while other possible options include *Neolloydia johnsonii*, as preferred by Benson (1969), or under other genera such as *Ferocactus* (Britton & Rose, 1922), *Thelocactus* (Marshall, 1947) or *Pediocactus* (Halda, 1998). The name *Sclerocactus johnsonii* was published by Taylor in 1987 (*Bradleya* 5: 94), and subsequently adopted in Hunt (2006: 260), although some other modern contemporaries such as Anderson (2000) and Eggl (2005) still prefer to keep it in *Echinomastus*.

Konnert, in Hochstätter (2005: 54), mentioned that a sample taken from

Fig. 1a *Echinomastus johnsonii* (Utah, S of Castle Cliff), seedling in full growth



E. johnsonii was most clearly differentiated from related genera, including *Sclerocactus*, by the isoenzyme genetic marker malate dehydrogenase, while Porter (1999: 5) pointed out that there are several short but distinctive insertions and deletions in the chloroplast DNA sequences of *Echinomastus johnsonii* and *E. erectocentrus* that are not found in *Sclerocactus*. This suggests that the *Echinomastus* lineage may have been independent from the *Sclerocactus* lineage for a considerable length of time, but sister to it.

The plant body is usually unbranched, but may cluster after injury to the apex. Stems are generally 10–30cm tall, 5–15cm broad, ovoid to cylindrical, with 17–21 acute ribs. The spines are variable in colour, ranging from yellow or pink to reddish or red-brown, concealing the plant body. There are 4–9 central and 9–10



Fig 1b (above) *Echinomastus johnsonii*, yellow-spined plant in flower Fig 1c (below) Red-spined plant in full flower



radial spines. The flowers are 5–9cm in diameter, pink or magenta with a red throat, or yellowish with a deep green throat. The fruit is green at first, drying to a brownish tan, splitting vertically to release the seeds, which are black and about 2mm long, quite large for cactus seeds. The plants usually flower in March or April. The flowers often appear in clusters on bigger plants, but often having difficulty in expanding because of the tight spination at the apex.

This species has a quite broad distribution range in the USA, in the Mojave Desert and on the extreme northern edge of the Sonoran Desert, within the states of Arizona, California, Nevada, and Utah. It prefers granite or limestone hills, dry rocky slopes, and alluvial fans at elevations of 500–1300m, growing with creosote bush (*Larrea tridentata*), often with other cacti and succulents, such as *Agave utahensis*, *Echinocactus polycephalus*, *Echinocereus engelmannii*, *E. triglochidiatus*, *Ferocactus cylindraceus* (also often called *F. acanthodes*), *Mammillaria tetrancistra*, *Opuntia acanthocarpa*, *O. basilaris*, *O. echinocarpa*, *O. hystricina*, *Yucca brevifolia*, *Y. schidigera*, and in the southern part of its distribution range also with the Saguaro (*Carnegiea gigantea*) and Ocotillo (*Fouquieria splendens*), which both belong to the typical Sonoran Desert flora. It shares the northwestern part of its distribution range with *Sclerocactus polyancistrus*. Although there are some places where these two species meet, I was not lucky enough to see them growing together at the same spot.

Alfred Lau collected plants near Jagueyes in the state of Chihuahua, Mexico, in 1986. He referred to them as *Echinomastus johnsonii fma.* (LAU 1543), and although these are represented in our collections these days as seedlings, I personally do not have enough experience with them to comment.

For some reason, I have always been most drawn to admire *S. johnsonii* from its northernmost populations in the extreme southwest of Utah. The plants from these populations always seemed to me to be the most beautiful, having the most colourful spines, especially after a short shower or during late afternoon when the low sun makes

the colours even more prominent. Maybe it was really because of the splendid landscape of this part of the distribution range of this cactus or maybe just for the reason that I saw my first wild population of *S. johnsonii* for the first time right here in spring 2002.

The southernmost population that I have studied was the one in Butler Valley, which happens to be the type locality of *Echinomastus arizonicus* Hester (1934). My friend J Kroulik has also found a yellow-flowering population further south, near Tonopah in Maricopa County, Arizona, and they may go still further south. Also, this species is probably closely related to *Echinomastus erectocentrus* and especially to its var. *acunensis*, which occurs more towards the south-east in Arizona.

Echinomastus johnsonii was discovered near St George, Washington County, in southwestern Utah, by



Fig. 2 *Echinomastus johnsonii* (Nevada, Henderson), a nice form with strong brownish spines

J E Johnson in 1870 and named as *Echinocactus johnsonii* by Parry and described by Engelmann one year later. The lectotype (an original specimen later selected to serve as the type specimen) was designated by Lyman Benson (1969). W H Earle, in his book *Cacti of the Southwest* (1986), incorrectly gave the type locality of this species as in Resting Springs, California, which is in fact the type locality for the variety *octocentrus*.

Several varieties have been described that today are all considered synonyms or *nomina nuda* (*nomen nudum* – name not published in accordance with the rules).

In 1896 Coulter described *Echinocactus johnsonii* var. *octocentrus* giving Resting Springs Mountains (probably a misspelling of Resting Springs in Inyo County, California) as its type locality. Parish wrote “type collected in the mountains east of Resting Springs” (Parish 1926), so I consider the population growing

over the pass in the Resting Spring Range (along SR 178) to be identical with the population of the original type locality of var. *octocentrus*.

As the varietal name *octocentrus* suggests, these Californian plants should differ by having 8 central spines, as opposed to usually 4(–6) centrals in plants from the eastern part of the range of distribution. Indeed, this variety was once considered to be the extreme western form of the species. Nevertheless, today there are other populations of *E. johnsonii* known more to the west, such as those around the ghost town of Ryan and in Echo Canyon, both in the Death Valley National Park, or around the small town of Shoshone, where you can often find the most expensive petrol in the area during the season. There are, moreover, other places where this species abounds, but not known to me. For example, some time ago, I noticed an on-line remark that this species grew around Darwin Canyon,

located on the western edge of Death Valley National Park. However, I cannot confirm this location since we saw only *Echinocactus polycephalus*, *Echinocereus engelmannii*, and some other common cacti in that lovely area, where we also enjoyed taking pictures of the beautiful Darwin Falls, a unique waterfall in the middle of a vast desert.

Plants with lemon-yellow flowers and chocolate-brown throat collected by M E Jones on gravelly hills at Searchlight, Nevada in 1925 were published by Parish as *Echinocactus johnsonii* var. *lutescens* (Parish 1926). As for the species, the variety also travelled from one genus to another, eg *Echinomastus johnsonii* var. *lutescens* (Parish) Wiggins or *Neolloydia johnsonii* var. *lutescens* (Parish) W T Marsh. ex R G Engard.

According to my experience, these plants usually differ from the type not only by the flower colour, but also by having more robust growth and usually thicker and differently coloured spines (uniformly red-brown, becoming grey-brown with age). This nice form with yellow flowers grows over a large area in the states of Nevada (NV) and Arizona (AZ), from Searchlight (NV) in the west, through Union Pass (AZ) to Chloride

Fig. 3 *Echinomastus johnsonii* (Arizona, Dolan Springs)





Fig. 4a (above) *Echinomastus johnsonii* (Arizona/Utah border, N of Littlefield). Landscape Fig 4b (below) A plant particularly well-endowed with flower buds



(AZ) and Bagdad (AZ, area along Joshua Tree Forest Parkway of Arizona) in the east, and to Tonopah (AZ) in the south.

At first, the two forms of *E. johnsonii* seem to form geographically separated populations, the pink-flowered one (var. *johnsonii*) usually growing north of the yellow-flowered one (var. *lutescens*). I was told by David Ferguson some years ago that intermediate multicoloured populations of *E. johnsonii* exist somewhere near Searchlight (NV) and perhaps near Mesquite (NV), but unfortunately he did not remember for sure where. "I remember all sorts of intermediate colours, mostly sort of a peachy colour with a darker centre, some brownish, others more pink with an orangy tinge" (Ferguson, pers. comm.).



While monitoring and studying this spiny cactus in the marvellous landscapes of the American south-west, it was my dream to see plants of this beautiful species with pink to magenta flowers next to the greenish-yellow-flowered ones, and possibly together with others of mixed-coloured flowers, but I was not lucky enough. Although I have found both forms within several miles of each other at several places (eg north of Searchlight in Nevada or between Dolan Springs and Chloride in Arizona) I did not encounter them growing together. Certainly, I thought, more field studies are necessary in these promising areas!

It is here that we reach the happy conclusion to the story! After I had finished the first draft of this article last year (2007), Josef Busek sent me a picture of an *E. johnsonii*, originally from Searchlight, which flowered in his collection for the first time in the spring of 2008 after an unbelievable 26 years of cultivation! That was a very proud moment for him, but for me it was a complete surprise: it had a magenta flower. I was a little bit suspicious at first, of course. Then the picture found its way to Jürgen Menzel from El Cajon in California before he went on a camping trip. On the way he stopped at the Searchlight area and actually found both flower colours on plants growing together

Fig. 5a (left) *Echinomastus johnsonii* var. *lutescens* from its type locality, W of Searchlight, Nevada. A tall specimen with many buds Fig 5b (above) The stunning yellow flowers that give it its name

at the same spot! That is the end of the mystery and I can sleep well again.

I have visited Searchlight several times. How could I miss the pink to magenta flowers? Now, I realise that it was pretty easy to miss them. I recall dry grass on the hills near Searchlight during the flowering and fruiting seasons where also, the plants of *E. johnsonii* in the area are plentiful but sparsely distributed. So, when I was searching for them and taking pictures, from a distance I visually preferred the yellow flowers of the var. *lutescens* to the pinkish red flowers of the *Echinocereus engelmannii* which flower at the same time. That way I managed to miss the other colour of the *E. johnsonii*. Also, Menzel was probably not at the exactly same spot as I was and plants that I saw could well have been predominantly yellow-flowered. The question



remaining is whether and where the transitional colours of flowers mentioned by Ferguson occur. Also, Hildegard Nase from Tucson distributed seeds in 1987, under the provisional, but never published, name of *E. johnsonii* var. *multicolor*, said to have golden spines and flower colours ranging from white to red or both.

The sympatric areas where both flower colours occur could be another reason for abandoning the varietal name *lutescens*. Areas where both colours occur yet do not appear to hybridise indicates that there may be some sort of genetic barrier in those areas, whilst the place mentioned by Ferguson with intermediate colours suggests that two different taxa are hybridising. To conclude that they represent a single, variable species would require that each colour can give rise to the other spontaneously, and there appears to be no firm evidence for that because seedlings appear to reproduce faithfully the colour of the parent plants. However, whatever the truth, for the moment the name *lutescens* is useful and can stay on labels in cactus and succulent collections for the nice yellow-flowering form.

There is another reason for abandoning the varietal name *lutescens* – the geographical distribution. We cannot say any longer that *E. johnsonii* with different

Fig. 6a (left) *Echinomastus johnsonii* var. *lutescens* (Arizona, S of St Maria River), a typical habitat scene Fig 6b (above) Example of a plant in full flower in mid-April



Fig. 7 At Searchlight, Nevada, plants of the magenta *Echinomastus johnsonii* and yellow-flowered var. *lutescens* can be found in close proximity (Photo Jurgen Menzel)

flower colours grow separately, but I am sure the name *lutescens* will still stay on labels in cactus and succulent collections for the nice yellow-flowering form.

When talking about the flower colours of *E. johnsonii*, another comment by Ferguson that will be interesting to verify in the field is that there are occasionally white-flowered individuals as a part of the pink/magenta populations near Las Vegas in Nevada (Ferguson, pers. comm.).

Hester had suggested the name *Echinomastus arizonicus* (incorrectly written as *E. arizonica*) for the yellow-

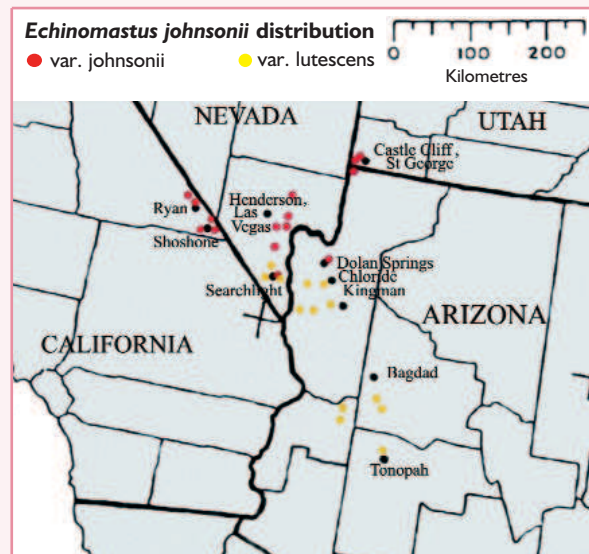


Fig. 8 Distribution map showing all locations of *Echinomastus johnsonii* seen by the author, with the exception of Tonopah

flowered *Ferocactus johnsonii* from Yuma County, Arizona (Hester 1934). In 1950 he designated a neotype from Butler Valley in Yuma County, but without any reproductive parts (flowers, fruits, or seeds). It is important to mention that Butler Valley today is located in La Paz County, which was created from the northern half of the Yuma County in 1983. These populations from the Butler Valley area are very interesting to me since their light-coloured spination more strongly resembled the typical pink-flowered *E. johnsonii*, when I saw them in winter 2004 for

the first time. Thus, full of excitement and uncertainty, I had to return to this place the following flowering season to verify they really do have greenish-yellow flowers (var. *lutescens*).

Maybe my article presents more questions than answers. The important aim is to create more interest in new field observations of this amazing species and also more interest among cactus growers. It is not a particularly difficult cactus to grow in cultivation, although it is rare to see flowering plants, and if you wish to possess heavily-spined plants that resemble those in nature, you will need to give them the hottest and sunniest spot in your greenhouse.

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