The Cactus Explorer

The first free on-line Journal for Cactus and Succulent Enthusiasts

Echinocereus Special

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Echinocereus dasyacanthus

This Edition

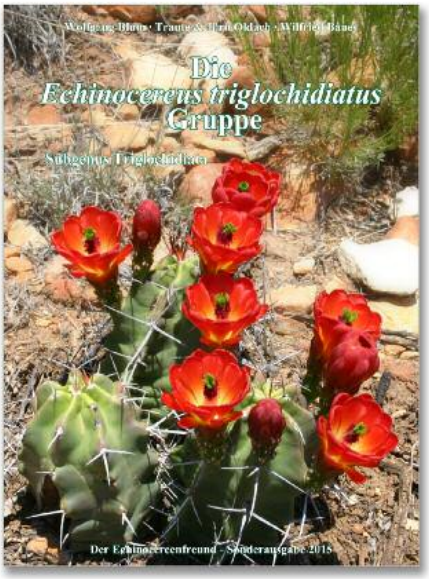
Introduction

This is a special edition dedicated to *Echinocereus dasyacanthus*. The contents were written by Wolfgang Blum, Traute & Jörn Oldach and Wilfried Baues. I am sure you will enjoy the wonderful pictures.

The next edition of the **Cactus Explorer** will follow soon. I am sorry you have had to wait for longer than usual. I have simply not had the time to create it over the busy summer.

Look out for the new book about the *E. triglochidiatus* group due to be published in October. More information in the next edition of the **Cactus Explorer**

Graham Charles



The No.1 source for on-line information about cacti and succulents is http://www.cactus-mall.com

Cover Picture *E. dasyacanthus* subsp. *dasyacanthus* USA, Texas, Pecos County near Fort Stockton. Photograph: Traute Oldach

Invitation to Contributors

Please consider the Cactus Explorer as the place to publish your articles. We welcome contributions for any of the regular features or a longer article with pictures on any aspect of cacti and succulents. The editorial team is happy to help you with preparing your work. Please send your submissions as plain text in a 'Word' document together with jpeg or tiff images with the maximum resolution available.

A major advantage of this on-line format is the possibility of publishing contributions quickly and any issue is never full! We aim to publish your article within 4 months and the copy deadline is just a few days before the publication date. There will be three or four issues per year, published when sufficient material is available. Please note that **advertising and links are free** and provided for the benefit of readers. Adverts are placed at the discretion of the editorial team, based on their relevance to the readership.

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15 September 2015

What is the typical Echinocereus dasyacanthus G. Engelmann?

Wolfgang Blum, Traute & Jörn Oldach, Wilfried Baues

This question was asked by the first mentioned author during the 2002 autumn convention of the Echinocereus Study Group in the city of Neuburg vorm Wald, Germany. As a result Wolfgang Blum looked into with this subject. In December 2006 he presented his first draft to the Echinocereus Study group. The draft was rejected because it was to be used as the basis for a new special edition "The *Echinocereus dasyacanthus* / *pectinatus* complex. The plan was to publish the first description of *Echinocereus pectinatus* subsp. *rutowiorum* W. Blum.

Dealing more intensively with this subject, one very soon finds out that the questions that arouse are not that easy to answer.

Therefore the following:

The *E. dasyacanthus* habitat distribution at Conchas Lake, San Miguel County, New Mexico could be seen as a growing area of neophytes. At today's level of knowledge, the distribution range of *Echinocereus dasyacanthus* sensu lato is as follows:

The northwestern boundary is the Potrillo Mountains west of Las Cruces, Dona Ana County and north of Roswell in Chaves County is the northern boundery. In the west, *E. dasyacanthus* can be found up to Villa Ahumada in Chihuahua. Adjacent to the southwest is the subspecies *rectispinus* (parapatric) (W. Trocha & W. Fethke) W. Blum, W. Rischer & J. Rutow.

The most eastern location as far as we know is west of Ozona, Crockett County. In the southeast the distribution ends south of La Cuesta de Malenain the northwestern Coahuila.

Adjacent (parapatric) we find *Echinocereus pectinatus* subsp. *wenigeri* (L. Benson) W. Blum & J. Rutow. As of today no locations in Coahuila are known where *E. pectinatus* subsp. *wenigeri* grows together with *E. dasyacanthus* (sympatric). Approximately 30km to the east *Echinocereus ctenoides* (Engelmann) Rümpler can be found. We don't know of connections and overlapping of the locations of *E. dasyacanthus* and *E. ctenoides*. Both occurrences are allopatric. In spite of many trips to the Sierra del Carmen0, transitional forms between *E. dasyacanthus* and *E. ctenoides* have never been found. The southwestern range ends near Delicas, where Roswitha and Carsten Runge recently discovered *E. dasyacanthus*. Recently a disjointed form with more ribs, more radial spines and consistently pink-crimson flowers, located west of Cuatro Ciénagas de Carranza, Coahuila de Zaragoza county, was described as *E. felixianus* Bauer.

We will report separately about the *E. dasyacanthus* forms with caespitose spines from around Castelon up to the Burro Mesa and the Ward Mountain and also about the forms in the Davis and Apache mountains up to the Balmorhea Lake.

West of Fort Stockton up to Bakersfield there are the so called multicoloured (coloured) or rainbow coloured *E. dasyacantus*. Here, the proportion of the plants with yellow flowers is 25%. Further east there are mostly *E. dasyacanthus* forms with pink flowers, where the proportion of the plants with yellow flowers is 35%. South of highway I10, west of Sanderson in Pecos County, there are forms with pink flowers and an orange midstripe. North of Sheffield there are large populations with approximately 50% yellow flowering *E. dasyacanthus*.

Another area where multicolored *E. dasyacantus* plants grow is the area around Lajitas up to the Chisos Mountains where they are rather rare. Statements from N.P. Taylor (176 & 180, 1984) that *E. dasyacanthus* can be found in northern Sonora and southern Arizona cannot be confirmed.

Frederick Adolph Wislizenus did collect *E. dasyacanthus* in northern Mexico in 1846.

In Wislizenus (1848): *Mémoires of a tour to northern Mexico 1846 and 1847,* one can read the first description of George Engelmann on page 100:

First description, Engelmann, 1848:

Echinocereus dasyacanthus, n. sp. ovato-oblongus, s. subcylindricus, 17–18 costatus, costis tuberculatis subinterruptis, areolis approximatis, ovato-lanceolatis, junioribus albo-villosis; aculeis albidis, junioribus apice rifidis, radialibus sub - 18 porrectis, summis brevioribus tenuiribus, lateralibus inferiori-busque longioribus; centralibus 4–6 pluribus deflexis.

El Paso del Norte. The specimen before me, one of the largest, is 12 inches high, and 3½ inches below, and 2 inches above in diameter; wool on the young areolae unusually long, deciduous; upper spines 3 lines long, lower lateral ones slightly compressed 6 to 7 lines long, lowest 5 lines long; central spines nearly as long as the last, stouter than the others. From *E. pectinatus* and *E. caespitosus* which it resembles, it is distinguished by the longer, not adpressed spines, the larger number and size of the central spines.

Authors' Note: El Paso del Norte today is Ciudad Juarez in Chihuahua, Mexico.

Additional data from Engelmann, 1849:

Cereus dasyacanthus, Engelm. l.c. not 19. Septdec. - octodecium - sulcatus; aculeis radialibus subporrectis, centralibus radiales subaequantibus, pluribus deflexis

Additional data from Engelmann, 1856, 1857:

C. dasyacanthus, E. in Wisl. Rep.: subcylind-ricus, simplex vel e basi ramosus; costis 16–21; areolis oyatis; aculeis 20–30 patulis cinereis apice saepe rubbelis, interioribus 3–8 paullo robustioribus deflexis; floribus subterminalibus magnis; bacca subglobosa; seminibus tuberculatis.

Var. ß. *minor*: aculeis paucioribus; bacca minore.

Common about El Paso: fl. April. - Plant 5–12 inches high, densely covered with numberless spines. Flowers 3 inches in diameter, yellow, an uncommon color in Cerei; in var. ß. only half as large.

Authors' Notes:

In: Engelmann (1856). - Synopsis of the Cactaceae of the United States and adjacent regions, on page 23 *E. dasyacanthus* var. *minor* is described..

On page 279 in: Engelmann (1857). - Proceedings of the American Academy of Arts and Sciences, in the reprint with corrections one can read the same.

In the paragraph: Corrections and Additions to the Synopsis of the Cactacece of the United States on page 345 one can read the following..... the var. *minor* of *Cereus dasyacanthus* should be cancelled, and thereafter he describes *Echinocereus roetteri*. ◎ First Description

In: Emory (1859), Cactaceae of the Boundary, the first drawings of *E. dasyacanthus* and *E. roetteri* are published.

Additional data from Engelmann, 1859:

C. dasyacanthus, E. in Wisl. Rep. : ovatus seu subcylindricus, simplex seu e basi parce ramosus, subcaespitosus; costis 15–21 rectis seu obliquis subinterruptis; areolis confertis ovatis; aculeis 20–30 rectis rigidis patulis stellatim undique porrectis intertextis cinereis apice saepe rubellis vel adustis, in plantis debilioribus albidis, exterioribus 16–24 quorum laterales longiores, superiores breves graciles, inferiores intermedii, interioribus 3–8 robustioribus; floribus sub vertice ipso subterminalibus magnis flavis; ovarii pulvillis 35–45 villosis aculeolos 15–18 albidos seu apice rubellos gerentibus; sepalis tubi late campanulati inferioribus 20–30 aculeoliferis, superioribus 15–20 petaloideis oblanceolatis acutis seu cuspidatis; petalis 15–25 spathulato-oblanceolatis mucronatis seu interioribus plerumque obtusis muticis; staminibus numerosissimis; stylo exserto subclavato; stigmatibus 13–18 viridibus erectis; bacca magna subglobosa aculeolata; seminibus subglobosis tuberculatis. (Tab. XXXIX, XL, et XLI, Fig. 1–2.)

About El Paso, and down to the canon of the Rio Grande; common on rocky hills and the edge of gravelly table-lands, where Dr.

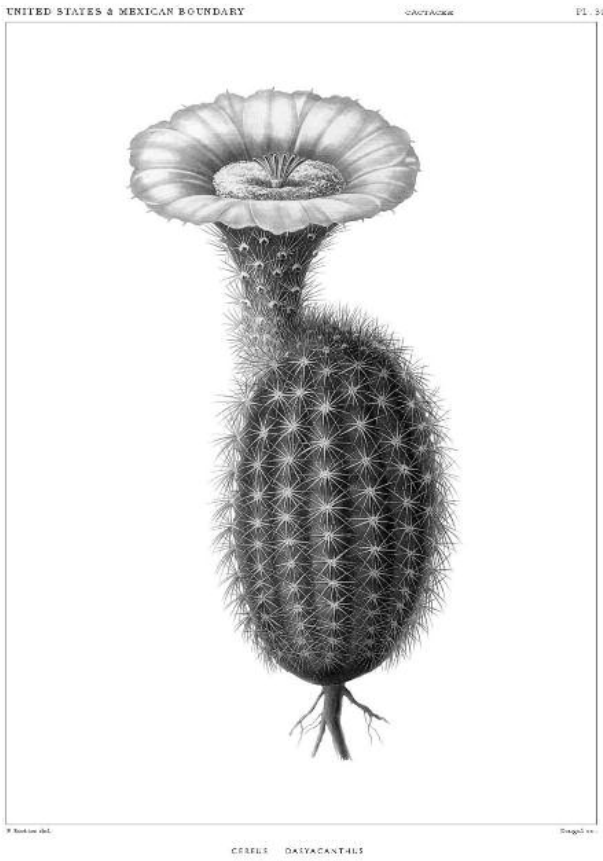


Plate 39 *Cereus dasyacanthus* with a single flower

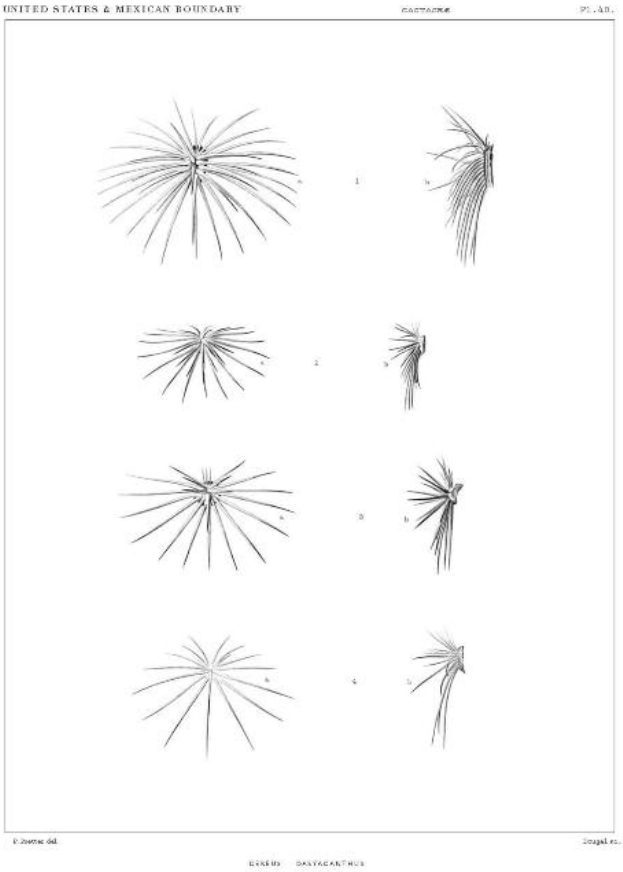
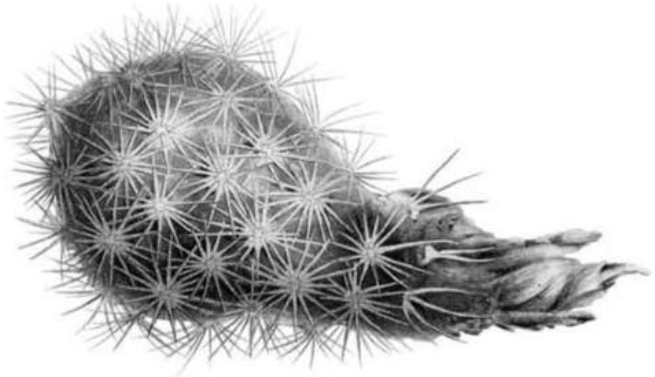


Plate 40 *Cereus dasyacanthus* with a single flower different spinepad in size, amount and proportion



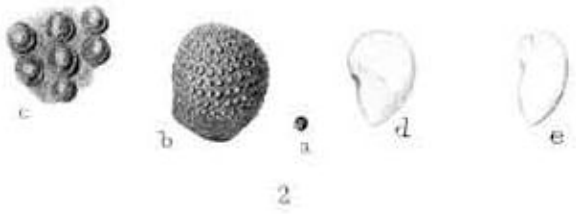


Plate 41 *Cereus dasyacanthus* fruit and seeds

Wislizenus first found it in 1846, and where the gentlemen connected with the Boundary Commission have since abundantly collected it in flower and fruit, and in numerous living specimens. -The geographical range of this species seems quite limited, as it has not been sent from any other locality but the one indicated. Fl. in April and May; Fr. ripe in June. - Stems 5–12 inches high, 2 or 3 or even 4 inches in diameter, densely covered by the innumerable ashy-grey or reddish spines; lower lateral spines somewhat bulbous and compressed at base, 6–7 lines long, upper ones 3–4 lines, and lower ones about 5 lines long; upper central spines shorter than the lower ones, these are the stoutest and of about the length of the lower external spines, or a little longer. Flowers large and numerous, from the upper axillae of the past year's growth, before the growth of the same spring is much advanced, so that they appear terminal or central at first glance, as they cover the top of the plant; this is the case with many spring-flowering Echinocerei; others, (e.g. the last mentioned species,) produce their flowers lower down on the plant from older axillae. Flower 3 inches or more in length, and of the same diameter, very showy, externally greenish

yellow, with the centre of sepals red; petals bright yellow; stamens counted by Mr. Wright, over 1700, with yellowish green filaments; pistil stout; stigmata thick, erect. Flower (like those of most Echinocerei) open in bright sunshine only, about the middle of the day, closing in the afternoon, but reopening the next, or even the third day, unless the weather be very hot, when all the functions of the flower are performed in one day. Fruit subglobose, 1–1½ inch in diameter, green or greenish purple, when fully ripe "delicious to eat, much like a gooseberry." Seeds 0,6 line long, subglobose, very little oblique, with an oblong basilar hilum, strongly and distinetly tuberculated, like those of *C. caespitosus*; embryo almost straight, or rather the cotyledons slightly bent forward.

Summary of the most important data of *E. dasyacanthus* (according to Engelmann):

Shape cylindrical, erect, height up to 30cm, diameter up to 10cm, ribs 15–21, radial spines 18–30 gray to reddish, lengths up to 15mm, central spines 3–8, similar lengths as the radial spines; flowers 8cm long or longer, same diameter; petals bright yellow, fruit nearly spherical, diameter 25–30mm, green or greenish magenta if mature. Locus typicus from El Paso del Norte to the Canyon of the Rio Grande.

During the research for his work "The complexity of species and varieties of *Echinocereus pectinatus*" L. Benson could not find the author's specimen from Engelmann in the Herbarium of the Missouri Botanical Garden [MO], USA. Either Engelmann did not deposit E. dasyacanthus or the herbarium documents (material) is missing. Thus L. Benson (1968) designated a preserved plant collected by Charles Wright in October 1849 between San Antonio and El Paso, Texas as a Neotype.

In 1938 *Echinocereus steereae* was described by Clover:

Echinocereus steereae sp. nov. (fig. 4), Simplex vel caespitosus, caulibus erectis, 8–12 cm altis, ca. 6 cm crassis; costis 16–18, tuberculis parvis; spinis lateralibus 16–24, acicularibus, albis vel rosaceis, centralibus plerumque 3–5, in serie singula verticali clispositis, areolis ellipticis; floribus magnificis, 10–11 cm. longis, 14–15 cm. latis, segmentis perianthii 5 - seriatis, exterioribus, fusco-olivaceis margine, pallide viridibus parte media roseopurpureis; stylo viridi; stigmatis lobis 12; filamentis viridibus; antheris luteis; fructibus ignotis. Specimen typicum vivum ex Montibus Texensibus "Chisos" dictis conservatum est in Horto Botanico Universitatis Michiganensis, Ann Arbor, Michigan; atque floribus siccis in Herb. MICH.

Echinocereus steereae n. sp. (Fig. 4). Plant simple or caespitose, with pinkish white appearance, not at all banded, largest stem seen 12cm long, 6cm across; ribs 16–18, tubercles distinct, small, flattened dorso-ventrally, alternating with those on adjoining ribs; areoles short-elliptic, if young densely white-wooly (wool lacking in older areoles), 5–7mm apart; radial spines 16–24, interlocking, 3–5 spines at the upper end of areole shorter, others about equal, spreading and slanting downward at an angle of 45 degrees; central spines 3–5, usually in a single row, bulbose at the base, shorter than the lower radials, stouter than the upper radials, usually a deeper pink. Flowering in April from areoles almost halfway up the stem to within 3cm. of the top; flowers ascending or standing at right angles to the stem, very showy, 10–11cm long, 14–15cm across; perianth segments in 5 whorls, the inner three rose-purple with whitish margins, 7–7.5cm long, 2cm across near center of segment, very narrow at the base and obtuse to cuspidate at the tip, somewhat erose; tinged with greenish-yellow toward the inside center, grading to deep turtle green at the center; outermost segments uneven, 1.5–3cm. long, tapering to a very narrow tip, olive-drab in midline, pale green and petal-like at the smooth margin, second whorl 5–7cm long, olive-drab in midline, pale green tinged with rose-purple toward the margin; style extending 1 cm beyond the stamens, white, 2mm in diameter, included, stigma lobes dark green, 12, somewhat fused, slightly recurved, decumbent; filaments greenish, anthers pale yellow; ovary 5cm long, 1.75cm across, its areoles 1cm. apart, circular, prominently white-wooly, with spines 14–15, spreading, rigid, acicular, 4–5mm long, white with brown tips; bracts bright green, tipped with pink, 2mm long, narrow; fruit unknown.

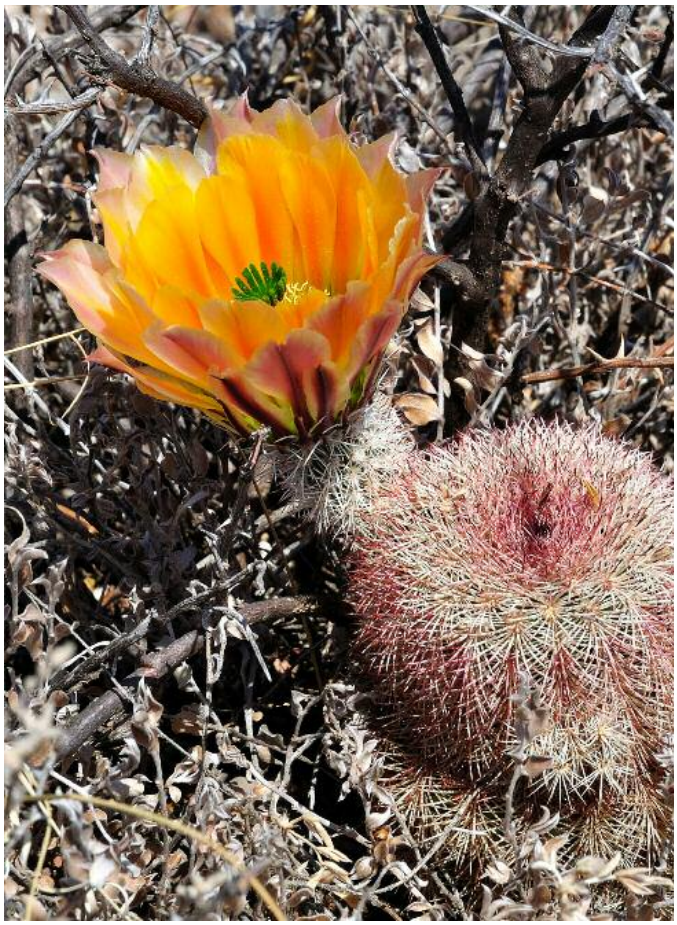
Collected by Mrs. Lois Steere in the Chisos Mts., western Texas, March, 1937.

With the description no plant material was

E. dasyacanthus subsp. *dasyacanthus*, Chihuahua south of Ciudad Juarez (18 Rd / 5 Md),
(Pictures: Daniel Sanchez, DS 49 above, DS 63 below)

E. dasyacanthus subsp. *multispinosus*, Chihuahua, Sierra El Morrion (Photographs: René Goris)

E. dasyacanthus subsp. *multispinosus*, Chihuahua, Sierra El Morrion (Photograph: René Goris)



E. dasyacanthus subsp. *multispinosus,* Chihuahua, north of Delicias (Photographs: Carsten Runge)

E. dasyacanthus subsp. *multispinosus*, Chihuahua, Coayme (Photograph: Carsten Runge)

E. *dasyacanthus* subsp. *multispinosus*, Chihuahua, Coayme (Photograph: Carsten Runge)

Echinocereus dasyacanthus subsp. *dasyacanthus*, El Paso County, east of El Paso

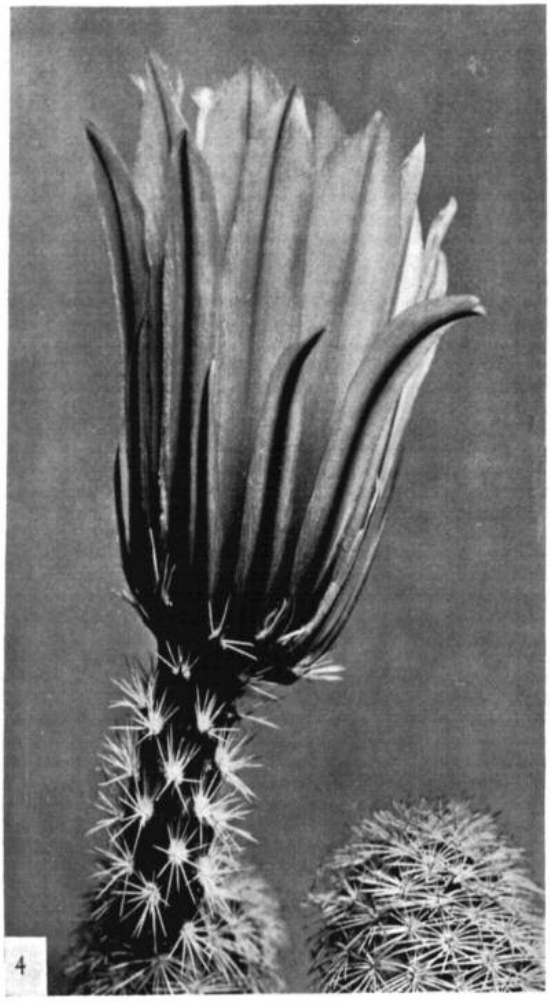


Fig. 4. *Echinocereus Steereae* in flower. (Slightly less than natural size.)

Left: **Lectotype**: *Echinocereus steereae* E. Clover

Above: Chisos Mts. Population

Type Locality
USA: Texas: Chisos Mountains, Mrs. LOIS STEERE
Lectotype (cf. H. Bauer & D. Felix. - In: Echinocereus, the dasyacanthus -pectinatus complex, 143.
Picture from: E. Clover. - *Bull. Torr. Bot. Club* 65: plate 4, page 568

preserved permanently, as Type "a plant of the living collection of University of Michigan Botanical Gardens" was quoted. Only in 1940 a flower of this plant was taken, preserved and deposited.

On the herbarium documents (sheets) A.A. Rexnicek & R.K. Rabeler noted in January 2004 the following:

"*Echinocereus steereae* E. Clover (Bull. Torr. Bot. Club 65: 565-568.1938) did not designate a holotype for this name. Rather, she cited the living collection at the University of Michigan Botanical Gardens, and flowers from it preserved in the University of Michigan Herbarium [MICH]. Accompanying the description was a photograph (Figure 4. page 568) of the living collection in flower. A living plant, however, is not eligible as a type. The flowers forming the MICH herbarium specimen were collected in 1940, two years after the publication. Thus they also cannot serve as a type. The photograph in the paper would be eligible to serve as a lectotype, given the absence of any eligible herbarium specimens."

The distribution area of *E. steereae* is stated "collected at the Chisos Mountains" an extensive area. Traute and Jörn did find identical plants (spine image and number of spines) at the Chisos Mountains.

Another location known to us with similar flower colour as mentioned in the description of *E. steereae* is near Lajitas appr. 50km west of the Chisos Mountains.

Felix & Bauer did include the yellow to coloured blooming *E. dasyacanthus* around Lajitas with the nominate form. Plants from Castelon and the north of it are included with *E. ctenoides* sensu Felix & Bauer. Unfortunately unaccountable because the first description of *E. steereae* did not mention yellow flowers.

Herbarium MICH: Herbarium sheet of *Echinocereus steereae*

Comparison Chart

Taxon	*E. dasyacanthus* Engelmann	*E. steereae* Clover	*E. dasyacanthus* Chisos mts.
Rib number	15 – 21	16 – 18	14 – 18
Total spination number	20 – 30	19 – 29	28 – 34
Radial spine number	16 – 24	16 – 24	20 – 24
Central spine number	3 – 8	3 – 5	8 – 12
Flower colour	yellow	purplish pink	pink- purplish pink with yellow orange - reddish center strip (midstrip) but also yellow

Echinocereus dasyacanthus subsp. *dasyacanthus (steereae),* Brewster County, Chisos Mts.

Echinocereus dasyacanthus subsp. *dasyacanthus (steereae),* Brewster County, Chisos Mts.

Echinocereus dasyacanthus subsp. dasyacanthus (steereae), Brewster County, Chisos Mts

Echinocereus dasyacanthus subsp. dasyacanthus (steereae) Brewster County, Chisos Mts.

Echinocereus dasyacanthus subsp. *dasyacanthus,* Brewster County, Lajitas

	E. dasyacanthus 'coloured flowers'	*E. ×lloydii* sensu Felix & Bauer (based on the existing photographs)	*E. ×lloydii* Britton & Rose
Rib number	14 – 19	11 – 19	11 - 13
Total spine number	24 – 39	13 – 39	13 – 22
Radial spine number	16 – 30	30 – 30	(11–) 12 – 16
Central spine number	5 – 11	2 – 11	(2–) 4 – 6
Flower length	80 – 105mm	50 – 105mm	50 – 90mm
Flower diameter	85 – 120mm	45 – 120mm	45 – 70mm
Flower sex distribution	synoucious	diocious and synocious	diocious

Flower characteristics

Right now the coloured and rainbow coloured *E. dasyacanthus* are the most popular and desirable plants and in our collections probably the most often seen echinocerei. Hardly any plant flowers like another. Echinocereus enthusiasts are already afraid that in the near future nobody will knows the yellow flowering plants and that these cannot be found any longer in our greenhouses.At the present nobody can prove whether the coloured flowering plants are still pure *E. dasyacanthus*.

In Felix & Bauer one can read the following: …..wherever both parents of ×*lloydii* occur, a more or less large number of hybrid forms of different generations and back-crossings can be found…..

This means where *E. coccineus* sensu stricto and *E. dasyacanthus* grow together one will find *E. ×lloydii* and these coloured and rainbow coloured *E. dasyacanthus*. These could been originated by permanent backcrossing and also by crossings of the F1-, F2-, F3- … and so on generations. This is a case of hybrid Introgression (penetration of a genotype of a foreign species by hybridisation and back-crossing.

Therefore, they classify all coloured flowering *E. dasyacanthus* as *E. ×lloydii*.

We suppose that the coloured forms between Fort Stockton and Sheffield are transitional populations to the pink-crimson flowering *E. dasyacanthus* forms of the eastern populations around Fort Lancaster.

These plants described recently by Felix & Bauer as *E. dasyacanthus* subsp. *crockettianus* are probably crossings with *Echinocereus ×lloydii* growing in this area .

Along the Highway I10 the total spine number also increases from 24–33 for *E. dasyacanthus* to 34–39 for *E. dasyacanthus* subsp. *crockettianus* . The transition forms are within this spectrum.

The number of ribs of *E. dasyacanthus* and *E. dasyacanthus* subsp. *crockettianus* are 14–19.

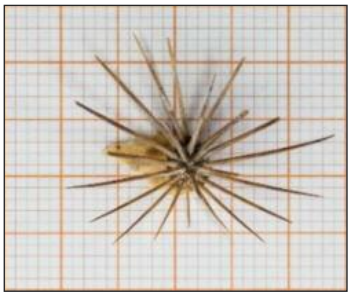
'Coloured flowering' *E. dasyacanthus* compared to *E. ×lloydii*:

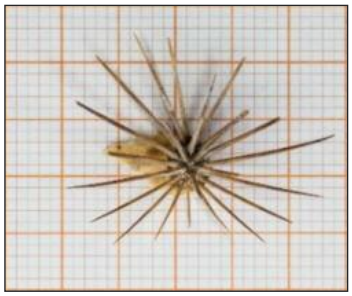
Ribs and total spine number of *E. ×lloydii* are significantly lower than of *E. ×lloydii* sensu Felix & Bauer.For these coloured blooming forms a synoecious flower shape has been ascertained in contrast to the diocious of *E. ×lloydii*.

Spine Characteristics

During the analysis of our spine counting we found out that one yellow flowering *E. dasyacanthus* population in the eastern Big Bend and adjacent Coahuila did have astonishingly high spine numbers; total spine numbers between 36 and 52. The result of our counting showed the following: 24–31 radial spines and 12–21 central spines.

***E. ×lloydii* areoles** (Radial-/central spines)


Pecos Co.: 19/6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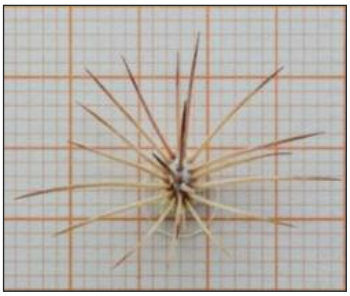
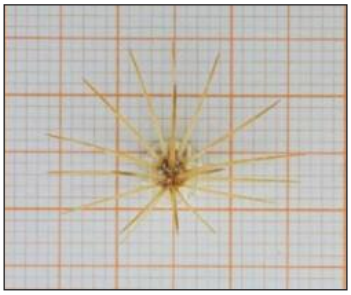
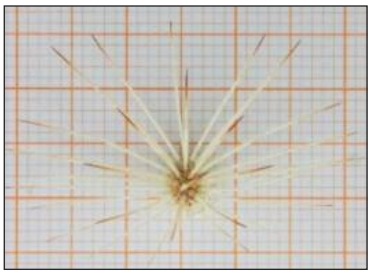
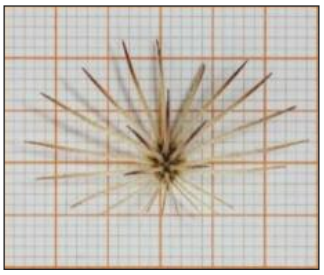
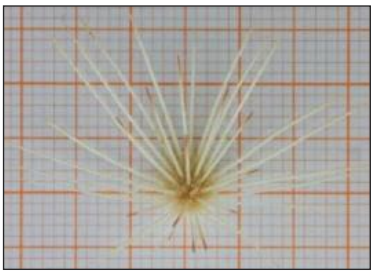

Upton Co.: 17/4

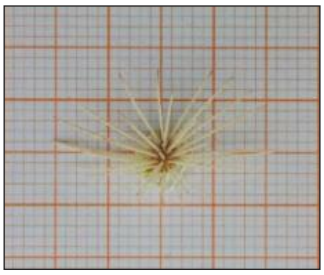

Brewster Co.: 14/5

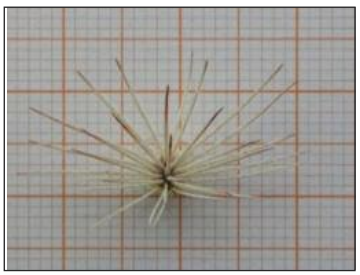
***E. dasyacanthus* subsp. *dasyacanthus* areoles**

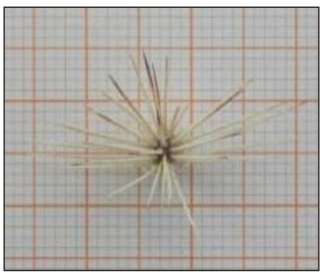

El Paso Co., Hueco Mts.: 22/9

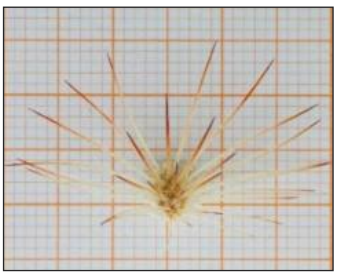

Culberson Co., s. Kent: 19/8

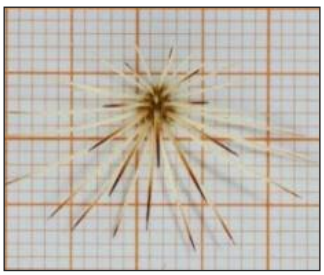

Pecos Co., s. Mc Camey: 24/14

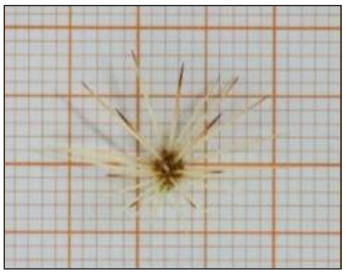

Pecos Co., s. Mc Camey: 24/12

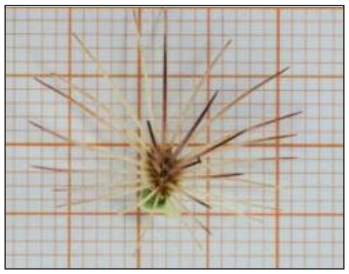

Pecos Co., Ft. Stockton: 19/12

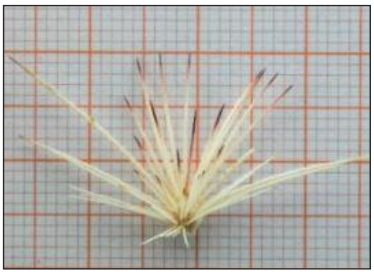

Pecos Co., Ft. Stockton: 19/15

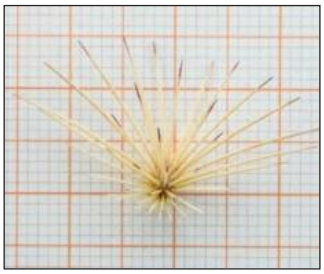

Pecos Co., Ft. Stockton: 21/12

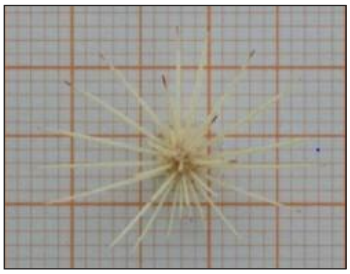

Pecos Co., Bakersfield: 21/11

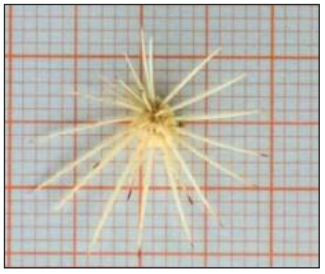

Pecos Co., Bakersfield: 20/8


Pecos Co., Bakersfield: 20/9

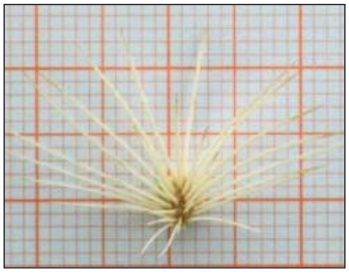

Terrell Co., sw Sheffield: 25/15

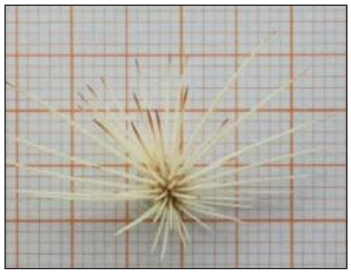

Terrell Co., sw. Sheffield: 26/15

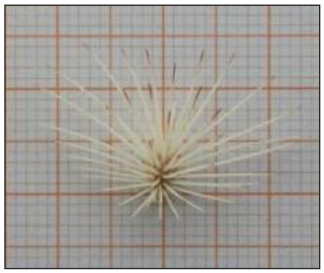

Crockett Co., Ft. Lancaster: 19/11


Ft. Lancaster: 19/11

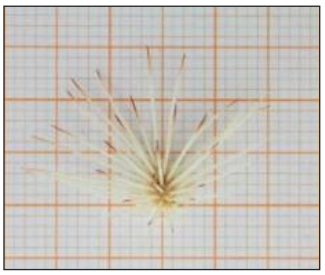

Ft. Lancaster: 27/15

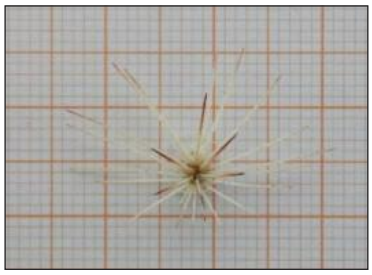

Brewster Co., Persimmon Gap: 21/13


Brewster Co., Black Gap: 31/19


Brewster Co., Black Gap: 27/21


Brewster Co., Black Gap: 25/16

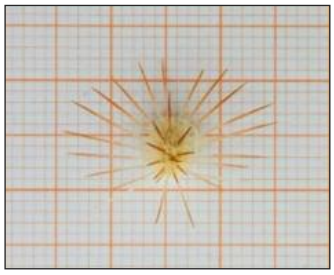

Brewster Co., Black Gap: 25/15


Brewster Co., Lajitas: 20/6

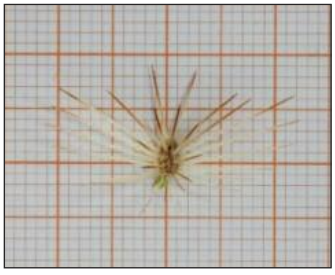

Brewster Co., Lajitas: 20/10

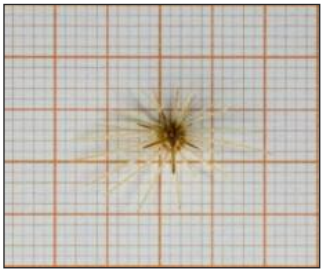

Brewster Co., Lajitas: 22/11

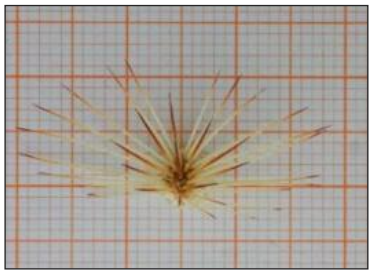

Brewster Co., Lajitas: 24/11

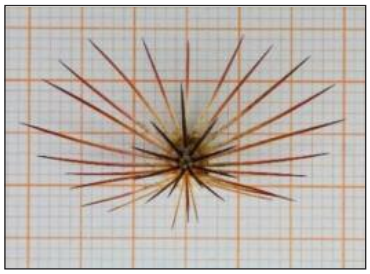

Brewster Co., Chisos Mts.: 21/11

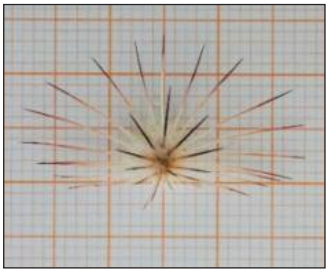

Brewster Co., Chisos Mts.: 20/6

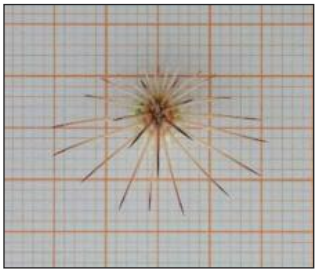

Brewster Co., Chisos Mts.: 21/10


Brewster Co., Chisos Mts.: 21/8


Chihuahua, sw. Ojinaga: 22/14


Chihuahua, sw. Ojinaga: 25/12


Chihuahua, El Morrion: 25/14


Chi, Los Muertes: 20/9

Could this be *E. dasyacanthus* subsp. *crockettianus* which normally has pink- purplish pink flowers?

This total spine number of course can also be found for *E. dasyacanthus* subsp. *multispinosus* Felix & Bauer, although its known distribution is approximately 200km to the west. According to Felix & Bauer one can find regular *E. dasyacanthus* in this area.

Table of the spine details of the *E. dasyacanthus* subspecies in accordance to Felix & Bauer

	Subspecies *dasyacanthus*	Subspecies *crockettianus*	Subspecies *multispinosus*
Total spine number	24 – 33	34 – 39	37 – 44
Radial spine number	16 – 20	24 – 30	24 – 28
Central spine number	5 – 8	9 – 11	12 – 20

Echinocereus dasyacanthus subsp. *dasyacanthus*, Pecos County, Ft. Stockton

E. dasyacanthus subsp. *dasyacanthus*, Pecos County, Ft. Stockton

E. dasyacanthus subsp. *dasyacanthus*, Pecos County, Ft. Stockton

Echinocereus dasyacanthus subsp. *dasyacanthus*, Pecos County, Ft. Stockton

Echinocereus dasyacanthus subsp. *dasyacanthus*, Pecos County, east of Ft. Stockton

↑ *Echinocereus dasyacanthus* subsp. *dasyacanthus*, Pecos County, Ft. S tockton

↓ *Echinocereus dasyacanthus* subsp. *crockettianus*, Crockett County, Ft. Lancaster

Echinocereus dasyacanthus subsp. crockettianus ?, Crockett County, Ft. Lancaster

Echinocereus dasyacanthus subsp. crockettianus ?, Crockett County, Ft. Lancaster

Echinocereus dasyacanthus subsp. *crockettianus* ?, Crockett County, Ft. Lancaster

Fruit Characteristics

At present, even the fruit and pulp colour cannot help us. In the first description is documented "green to magenta when mature". In our climate one can never be sure that the fruits ripens completely.

In our collections, Dieter Seeger and we found, on plants classified as *E. dasyacanthus*, the following fruit and fruit pulp colors:

green fruits with white pulp
green fruits with reddish - magenta pulp
brown - violet fruits with greenish pulp
brown - violet fruits with reddish -magenta pulp
reddish - magenta fruits with white pulp
reddish - magenta fruits with reddish -magenta pulp

Habitat collected green fruits contained black seeds that did not germinate.

In Felix & Bauer the following fruit and fruit pulp data are listed:

	subspecies *dasyacanthus*	**subspecies *crockettianus***	**subspecies *multispinosus***
Fruit colour	greenish, dark green, brownish, red	reddish, red, dark red, aubergine	greenish, brownish, reddish
Pulp colour	white, pink, red	white, reddish, red	white, bright pink

As however for example at *E. fendleri* (Engelmann) J.N. Haage, *E. engelmannii* (Parry ex Engelmann) Lemaire and many other species these characteristics are constant and during years provable the same for a long time the question did arise:

Could it be possible that here the hybrid introgression shows its influence or is here indeed our instable weather the reason. At the present its checked in a long term trail (experiment) if during some years period the weather conditions are influencing the color of the fruit and of the pulp.

Further information about the first description and combinations of this kind can be found in Blum *et al*, (1998).

Taxonomically validly published:

1848: *Echinocereus dasyacanthus* Engelmann
1849: *Cereus dasyacanthus* (Engelmann) Engelmann
1891: *Cactus dasyacanthus* (Engelmann) Kuntze
1892: *Echinocereus pectinatus* var. *dasyacanthus* (Engelmann) Haage JR
1938: *E. steereae* Clover
1944: *E. pectinatus* var. *neomexicanus* sensu L. Benson (pro parte)
1945: *E. dasyacanthus* var. *steereae* (Clover) W.T. Marshall

Invalidly published:

1970: *E. pectinatus* var. *steereae* Weniger nom. inval.
1971: *E. pectinatus* var. *dasyacanthus* L. Benson ex Earle nom. inval.
1984: *E. pectinatus* var. *dasyacanthus* Earle ex N.P. Taylor, younger Homonym
1985: *E. pectinatus* var. *dasyacanthus* (Engelmann) N.P. Taylor, younger Homonym

For a long time *E. dasyacanthus* was stated as a variety of *E. pectinatus* (Scheidweiler) Engelmann.

Only at the end of the 1980s (Weedin, Powell & Kolle) studies based on chromosome counting revealed the following significant difference from *E. pectinatus*:

E. pectinatus n = 11 (diploid)

E. dasyacanthus n = 22 (tetraploid)

Summary

Today we describe *E. dasyacanthus* as follows:

Shape: cylindrical, erect, branching; height up to 40cm, diameter up to 10cm (or more); Rib number 15–19; radial spines 16–30, colour white to brown, length up to 25mm; central spines 4–20, a little shorter than the radial spines. Flowers: length 10cm, diameter up to 15cm; petals white, yellow, orange, pink, magenta and multicoloured to rainbow coloured yellow to magenta with different gradations in one flower). Fruit almost spherical, diameter 25–35mm, dark green to greenish - magenta when mature.

Range: (see above)

Warped Neotype: USA; Texas; between San Antonio and El Paso [MO 2016859]
http://www.tropicos.org/Image/3110
Comment of the authors
If one cuts both parts of the above images they fit precisely. This clearly contradicts the statements of Felix & Bauer on pages 36 – 37.

E. dasyacanthus subsp. *dasyacanthus,* New Mexico, Chaves Co., Roswell, northernmost Population

Along Highway I10 from El Paso to San Antonio; between El Paso and Fort Stockton we mostly find yellow flowering *E. dasyacanthus* (approximately 90%). Around Fort Stockton up to Bakersfield we find yellow (approximately 25%) seldom pink and magenta flowering *E. dasyacanthus*.

Between Bakersfield and Sheffield we find multicoloured and purplish-pink *E. dasyacanthus* subsp. *dasyacanthus*; but also here yellow flowering (approximately 35%) *E. dasyacanthus* still can be found.

North of Fort Lancaster the portion of the yellow flowering *E. dasyacanthus* is approximately 50%.

Directly around Fort Lancaster we find the subsp. *crockettianus* with flower colours from pink - purplish pink, rainbow coloured and pure yellow. See also in: Die fantastischen Blüten von *Echinocereus dasyacanthus* by Martina & Andreas Ohr).

It is not easy to say what the typical *E. dasyacanthus* is. It is certain that for the first description the yellow flowering plants from the area around El Paso del Norte in Chihuahua, today Ciudad Juarez, have been used and it is also certain that there is the Type Locality.

This unequivocally can be proved by maps from that time.

The Neotype from between San Antonio und El Paso determined by L. Benson is not happily chosen but is at the present valid in the absence of a better alternative.

There is a distance between the two locations of 800km, on the western 500km *E. dasyacanthus* sensu stricto can be found!

It is also in conflict with the protologue of the ICN, 2011, Art. 9.19 (b) ……The author who first designates (Art. 7.9 and 7.10) a lectotype or a neotype in conformity with Art. 9.11–13 must be followed, but that choice is superseded if (a) the holotype or, in the case of a neotype, any of the original material is rediscovered; the choice may also be superseded if one can show that (b) it is in serious conflict with the protologue and another element is available that is not in conflict with the protologue, or that (c) it is contrary to Art. 9.14. and could therefore be replaced.

A suitable choice as a neotype is the Daniel Sanchez (DS 63) collected E. dasyacanthus from just south of the Type Locality in the Sierra el Presidio.

***Echinocereus dasyacanthus* Engelmann In: Wislizenus - *Mem. tour north. Mex*.: 100 (1848)**

Type Locality

Mexico, Chihuahua, El Paso del Norte (Ciudad Juarez), Aug 1846, *F.A. Wislizenus*, not preserved

Neotype

(Superseding that designated by Benson 1968):

Mexico: Chihuahua: Sierra el Presidio, south of Type Localty (El Paso del Norte), 1336m NN, leg. *Daniel Carbajal Sánchez* 63, *Salvador Arias & Balbina Vásquez*, 30 April 2010 [MEXU]

Echinocereus dasyacanthus Engelmann In: Wislizenus - *Mem. tour north. Mex*.: 100 (1848)

Type Locality

Mexico, Chihuahua, El Paso del Norte (Ciudad Juarez), Aug 1846, *F.A. Wislizenus*, not preserved (deposited)

Neotype

(cf. L. Benson 1968, *Cact. Succ. Journ. (US)* 40: 125): l.c., USA, Texas San Antonio to El Paso, Oct 1849, WRIGHT [MO]

Translation under herbarium specimen:

Neotype: USA; Texas; between San Antonio and El Paso [MO 2016859

http://www.tropicos.org/Image/3110

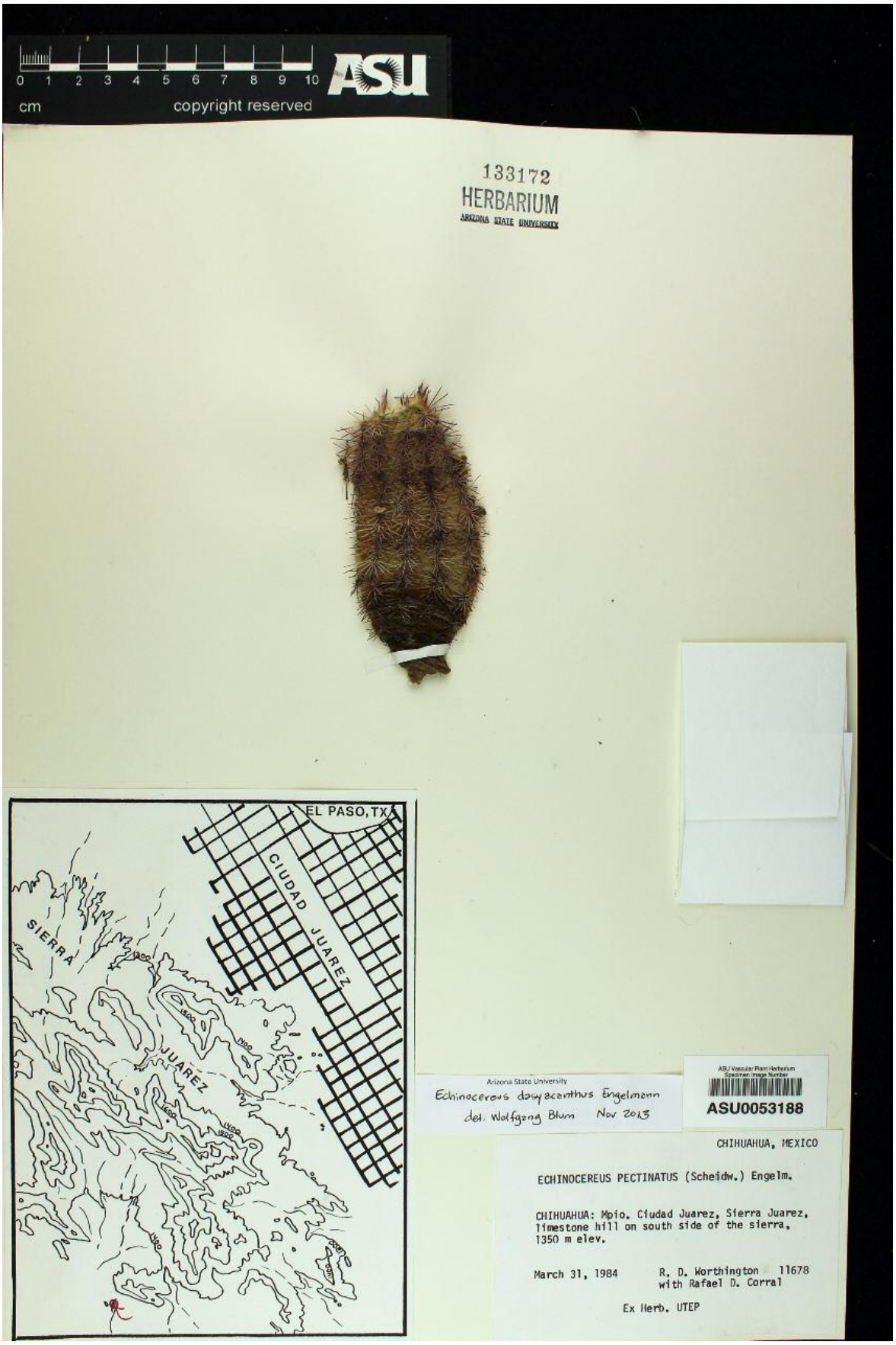
After W. BLUM & M. LANGE in the *Echinocereus Online Journal* 2(3) 152 (2014) designated a Lectotype for *Echinocereus ×roetteri* Rümpler, then in *Echinocereus - Der dasyacanthus -pectinatus-Komplex*, by Felix und Bauer on page 245 the attempt was made to establish a new Lectotype.

Concerning this the following explanations

The ICN clearly regulates how to handle published types:

According to the ICN (International Code of

Neotype: Mexico: Chihuahua: Sierra el Presidio, south of type locality (El Paso del Norte), 1336m NN, leg. Daniel Carbajal Sánchez 63, Salvador Arias & Balbina Vásquez, 30 April 2010 [MEXU]



http://swbiodiversity.org/imglib/seinet/ASU/201311/ASU0053188_lg.jpg

Investigated comparative material from herbarium ASU, near the type locality

Echinocereus dasyacanthus subsp. *dasyacanthus,* Pecos County, east of Ft. Stockton

Echinocereus ×*lloydii,* Pecos County, east of Ft. Stockton

Nomenclature for algae, fungi, and plants 2011, Melbourne Code):

Art. 9.19. The author who first designates (Art. 7.9 and 7.10) a lectotype or a neotype in conformity with Art. 9.11–13 must be followed, but that choice is superseded if (a) the holotype or, in the case of a neotype, any of the original material is rediscovered; the choice may also be superseded if one can show that (b) it is in serious conflict with the protologue and another element is available that is not in conflict with the protologue, or that (c) it is contrary to Art. 9.14.

Lectotype: *Echinocereus xroetteri*; Bigelow collection of 10 April 1852 in MO 2016863 (Barcode 00148036) Mexico, Chihuahua [El Paso del Norte / Ciudad Juarez], near sandhills.

http://www.tropicos.org/Image/100229188

The Lectotype of *Cereus roetteri* Engelmann established by W. Blum & M. Lange was clearly based on original material. At the time of the first description this material was at the author's disposal.

With this fact the essential criterion is fulfilled which qualifies the herbarium specimen as a possible Lectotype.

Felix & Bauer criticize the choice that was made and undertake to create a new Lectotype in contavention of the Code.

For that reason the illustration in Engelmann 1859 has been selected. Beside all other criteria which are essential for the selection of a nomenclature type, it is not unambiguously known that the drawings in the prologue of the first description represent original material. They are as far as we know not dated! In this case they only have the status of a Neotype. In anaalysing the whole situation one has to take into consideration:

The Lectotype legitimately published shows in the manuscript of Engelmann the name "*Cereus roetteri* spec. nov." This is a clear indication that the first author during the preparation of his publication was in possession of this sheet personally! With his words he gives the herbarium specimen the character of a Holotype!

If one wants to follow the description of the first author the selection which W. Blum & M. Lange made was without an alternative. To maintain the stability of nomenclature this general principle has always to be followed.

Status

For this reason the above mentioned Lectotype from Bigelow for *Echinocereus ×roetteri* Rümpler is still valid.

Acknowledgements

We thank:

- A.A. Reznicek and R.K. Rabeler of the Herbarium of the University of Michigan, Ann Arbor, USA for the herbarium sheet of ,,steereae" and important information.

- The herbarium of the Missouri Botanical Garden, in Saint Louis, Missouri, USA for the herbarium sheet of "dasyacanthus".

- The library of the Missouri Botanical Garden, in Saint Louis, Missouri, USA for the copies of the first description of "steereae"

- Dr. Urs Eggli for his views of the problem.

- Dr. Jochen Müller for his help.

- Michael Lange for his continuing discussion about *E. ×roetteri.*

- Dieter Seeger for his useful information.

- Carten Runge for photographic material.

Glossary:

sensu stricto = in the sense of

allopatric = habitat ranges of species, subspecies or populations not overlapping.

parapatric = The distribution areas are close together but not overlapping.

sympatric = Species, subspecies or populations occur (can be found) in the same geographical area, at least in part growing together so the possibility of cross pollination exists.

synoicous = having male and female flowers on one head (for example : *E. triglochidiatus*)

dioecious = having the male reproductive organs in one individual and the female organs in another (for example: *E. coccineus*)

monoecious = having only male or female reproductive organs in any single flower but both types of flower on the same individual (not found in *Echinocereus*).

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