

# A hard-to-manage taxon: The Black Lace Cactus *Echinocereus fitchii* ssp. *albertii*

## Abstract

The cactus enthusiasts of our world place a high intrinsic value on their work! It seems the more rare or endangered the point of view, the greater the desirability. Some are mostly eager to complete their collection; others deal with propagation, while still more debate taxonomic and nomenclatural status. Europeans especially like to publish about lost or missing species or even new locations, the “non plus ultra”. Something different occurs in the home countries of succulents where increasingly practical issues of species conservation are pushing into focus. This background is especially important for the entity known as *Echinocereus melanocentrus* later described as *E. reichenbachii* var. *albertii*, which is endemic to south Texas.

Despite the efforts of the Texas government, these cacti are caught between conflicting land use issues. As a result the conservation efforts regarding these cacti in Texas shall be improved. In this context, the present article is intended as taxonomic-nomenclatural awareness training as well as documentation and call for help regarding the habitat conditions. Hopefully, the characteristics that we admire in cultivation in the European greenhouse can be returned to the native land. The description and naming of the white-blooming cultivar ‘Margaret’ acknowledges the widow of the eponymous Dr. Richard O. Albert for their support for earlier fieldwork.

It is hoped that this publication has a positive influence on the fate of this small, extremely interesting, and worthy of culture cactus.

## Introduction

In many books *Echinocereus melanocentrus* or *E. fitchii* ssp. *albertii* (syn. *reichenbachii* var. *albertii*), is especially recommended for beginners in the cactus hobby. It is a miniature, simple to cultivate plant, and even flowers easily with large, beautiful blossoms that are very long-lasting!

Cultivating and producing this flower alone can be a key experience for the hobbyist. As one of my (M.J.L.) very first flowers of an *Echinocereus*, this irrevocably inflicted me with “Echinocerei-mania”.

The plant was named after the Alice, Texas based surgeon and cactus enthusiast Dr. Richard Orvil Albert (10<sup>th</sup> September 1920 – 10th March 1990). 25 years after the adoption of the Recovery Plan (USFWS 1987), the population shrank dramatically. Only by studying the natural and genetic diversity can the necessary conservation strategies be further developed and ultimately implemented.

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## Nomenclatural and taxonomical history

*Echinocereus melanocentrus* Lowry was first mentioned in 1936 in the literature, but only in 1960 did Backeberg provide a description, though invalid. Lowry (loc.cit.) refers to plants growing on deposits in Jim Wells County near Alice, and a small presence in Kleberg County (Fig. 1), which he had known for some years. Backeberg received his description underlying plant material from the importer Davis.

In 1969, the first valid description was published: *E. reichenbachii* var. *albertii* L.D. Benson. The population in Refugio County (Fig. 2) has been known at least since 1974 (FB Jones 8043, CC Museum 11th April 1974). It stands out due to a strong reduction of the central spines and actually appears more like an example of *E. reichenbachii*.

The first monographic treatment of the genus by NP Taylor (1985) places the *albertii* taxon in synonymy under *E. reichenbachii* var. *fitchii*. In 1998, Blum et al. made the combination of *E. fitchii* ssp. *albertii* (L.D. Benon) Blum et Lange. 1999 again places the Taylor *albertii* as a synonym for the same reorganized



1. *Echinocereus fitchii* ssp. *albertii*: flowering plant in Kleberg County (photo by W. Blum).

*E. reichenbachii* ssp. *fitchii* (L.D. Benson) N.P. Taylor.

In 2004 (Blum et al.), with the independent repositioning of *E. reichenbachii* versus *E. fitchii*, another near relative from Mexico, *E. fitchii* ssp. *bergmannii* Blum & Felix, was described.

Finally, in 2011, in consultation with Dr. Taylor, *E. reichenbachii* ssp. *albertii* (L.D. Benson) Pilbeam was produced. So it now seems naming any way is possible, and fellow cactus-lovers can decide according to their own taste, to which version they want to give preference!

### Distinctive features within the species *E. fitchii* and *E. reichenbachii*

Until 1969, all authors agreed that *E. fitchii* Britton & Rose and *E. reichenbachii* (Terscheck ex Walpers) Hort. F.A. Haage were separate species. It was just classified by Benson (1969) within a very wide ranging (“lumping”) concept of *E. reichenbachii*. This was an unfortunate situation insofar as the typical *E. reichenbachii* sensu stricto is a representative of the Mexican flora and is not found in the United States. Nevertheless, the US-American taxa *E. baileyi*, *caespitosus* and *perbellus* were placed in *E. reichenbachii*



2. *Echinocereus fitchii* ssp. *albertii*: flowering plant in Refugio County (photo by W. Blum).

sensu lato, but whether this actually reflects the natural affinity, cannot be examined in more detail at this point.

If one wants to distinguish the two species, *E. fitchii* and *E. reichenbachii* one must offer a range of characteristics which lead in total to a correct determination (cf. Blum et al. 1998: 310 ff. and 2004: 312 f). While the typical Mexican *E. reichenbachii* sensu stricto has a tuberous root and only has central spines when young, the three subspecies of *E. fitchii* always have a fibrous root system and even central spines. Only those in the population in Refugio County have centrals very small and usually appear sporadically on a few areoles of a plant. Another description of spine color: Examining the few presently defined plant specimens from the western *albertii* populations (cf. Blum & Felix, 2007) reveals black tipped spines and almost entirely black-colored central spines but one total of “bright” overall impression. The eastern plants from Refugio County show a dark brown to black overall appearance. On closer inspection, the spines appear almost dark colored.

Particular attention should be paid to the flower. All *E. fitchii* subspecies have a dark flower throat



3. *Echinocereus fitchii* ssp. *fitchii* seed raised plant of SB0861, Webb County 4 & 5. *Echinocereus fitchii* ssp. *fitchii* at the Las Estrellas habitat, Star County.

(Figs. 3-5). This is not a result of shading or reflection but a real color deviation. Even the white-flowered *albertii* cultivar shows this feature in the presence of a greenish flower throat. In contrast, the *E. reichenbachii* pink-magenta flower possesses a striking zonation of white, followed by a darker pink-magenta or greenish flowers throat (Fig. 6). The “typical” bright zone may sometimes be missing or will become colored in the course of several days of flowering.

While conducting field observations in the south border county of Zavala, and Frio, Atascosa and Karnes Counties when flowers are not present the observer should assume that only representatives of *E. fitchii* will be found. The only exception is in McMullen County, where both species occur eventually (see below).

Within *E. fitchii*, ssp. *albertii* is the northern most spread subspecies characterized by their (0) 1-4, almost the entire length (gray) black central spines is contrasting of the spiny brown and with 4-7 middle (white with brown tips) marked nominate (ssp. *fitchii*). The nominate subspecies was also previously found south of the Rio Grande at El Azucar/Tamaulipas (Dosedal 2011). In 2004 the ssp. *bergmannii* was first described from material found in the collections raised from field documented seeds of the Lau-collections 1061, 1086, 1388 or 1394 (Fig. 7). Its characteristic is the spine dimorphism between shaggy juveniles and adults forming a distinct pectinate spine pattern. The spine color varies from white to brown to black as well, while the centrals of the mature plants are almost shorter than 5 mm. The nominate subspecies only blooms once a year, while the other two subspecies can produce multiple flower seasons. For further

detailed information see Blum et al. 2004.

#### Impacts, conservation status and management

Under Appendix 1 of CITES, only two *Echinocereus* taxa are listed. The Black Lace Cactus falls under Appendix 2 (Helmer & Schippmann 1994: 39ff.).

According to the representation of the population development in U.S. Fish and Wildlife Service (2009) and the author’s own, following location research (in March 2012), the taxon *E. fitchii* ssp. *albertii* is classified as “Endangered” on the UNESCO Red List criteria (2001). In accordance with U.S. law the taxon was federally listed on October 16, 1979 (44 FR 61918) and state listed May 18, 1987 (cf. Poole et al 2007: 194).

The taxon is native to the Rio Grande Plain and South Texas Brush Country in different natural regions of Texas (cf. Poole et al. 2007: 4) (Fig. 8).

The specific habitats are grassland, thorn scrublands, and mesquite woodland on sandy, somewhat saline soils (Poole et al 2007: 195). An exact description of the habitat characteristics was provided by Emmett (1989: 25 ff.) for the Kleberg County population. From the type population there is only one known photo (Benson 1982: 671 Figure 707). Ross (1981) examined the chromosomes of plants from the type population (collected as RR 175 and pressed a Herbarium voucher OKL 28 284 175), and described the soil type as a heavy clay soil and the habitat as partially grazed. (Neither the living collection at the University of Oklahoma in Norman, nor availability of RR175-specimens or descendents was examined by the authors.) The location in Refugio County was



6. *Echinocereus reichenbachii* (sensu lato) in cultivation ex Kerr County, Texas. 7. *Echinocereus fitchii* ssp. *bergmannii*, a cultivated plant ex Lau 1061, Las Crucitas, Tamaulipas (photo by U. Raudonat).

briefly described in Blum & Felix (2007).

The populations that were already collected in the 1930s are very probably extinct. It is clear that around 1960, the son of a local farmer who brought plants to the school, rediscovered a population east of Alice. This rediscovery came about through the efforts of the locally known cactus friend and surgeon, Dr. Richard O. Albert, but the population had been reduced to a few dozen plants by brush clearing (USFWS 1987: 2, 7).

Dr. Albert succeeded, however, in the discovery of another population south the destroyed location, from which the holotype was taken in 1965. This location was protected and certainly remained so at least until the death of Dr. Albert. His widow knew nothing of the population declining in this time.

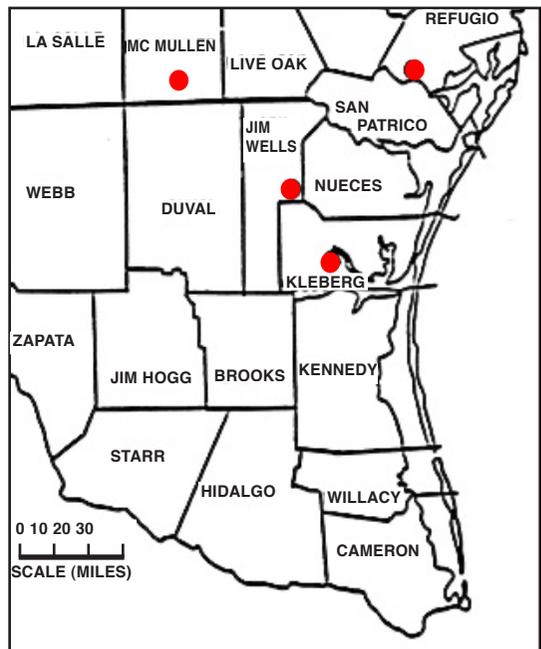
Habitat destruction, especially brush clearing to create cropland, is the main threat of today, while collection activities are not known to actually impact the populations. Yet it is these activities, which undoubtedly were the main cause of the danger in past decades, which need to cease. Additional hazards are overgrazing and sowing of coastal Bermuda grass which then automatically subsequently continues to spread becoming invasive.

The implementation of the Recovery Plan has so far failed in some essential respects, as resources are not available to discover new or potential habitat, no ex-situ cultures survived and there are no voluntary contractual agreements with the land owners to protect the present habitat.

From the compilation in USFWS (2009: 9, Table 1) it can be seen that a disastrous population loss of about 95% has occurred in the period since the

publication of the Recovery Plan (USFWS 1987 until 2004/06 (in 2004/06 the type population was not examined, and so the physical inventory losses are hopefully lower).

This clearly raises the question of whether more frequent visits to the localities by designated botanists and dedicated cactus enthusiasts could have helped to raise attention of the land owners to the local populations to better protect this little gem!



8. Distribution of *Echinocereus fitchii* ssp. *albertii* (cf. USFWS 1987: 3; updated by M.J.L.)



9. *Echinocereus fitchii* ssp. *albertii* Refugio County: freshly germinated plants F2 generation ex Poole & Price 2004-0183-1000.

### Plants in cultivation

In the German and Central European specialist collections, no documented plant material was available by the year 2005. While in the eastern parts of Germany pre-war material was diligently propagated, in the western states there were mainly seed raised plants propagated by Mesa Garden nursery from undocumented origin. In some nursemens lists, seeds turned up with the designation “*albertii* Alice”, but upon enquiry were learned to not necessarily be pure (being an assumption simply because no other location was familiar). This is especially the case in Blum et al. (2004: 262f.)!

A single plant with the unique hint “n Alice” on the label has recently been discovered in a California private collection (Fig. 10). That can be presented and defined here in as a true image of a plant from the type population.

Visitors to the population in the Kleberg County have produced some good illustrations in the literature (Blum & Felix 2007, Pilbeam 2011). Also for the Refugio population meets this limited by Blum & Felix (2007). As shown in the last 5-year Review (USFWS 2009: 6) over 2000 seeds were collected in 2004 from the Refugio County population (Poole & Price 2004-0183-1000). This initiative was boosted by a request of the author (M.J.L.) to import the documented seed material to Germany (export permit MA087790-0, October 20th 2004). With the help of friendly enthusiasts a plant inventory was created from several small sowings from about 100 original seeds (Fig. #). These have now flowered for several years and bear fruit. This favorable circumstance is due to the fact that this seed material for the first time came from overseas. What is striking is that these



10. Cultivated plant from the type population near Alice (photo by J. Menzel).

plants have an unusually dark epidermis, enhancing its characteristic appearance. Meanwhile, the F2-generation is in a few collections and the several thousand seeds harvested, have proven viable for at least 4 to 5 years.

For over 10 years a clone with white flowers has been produced by the K.-W. Beisel nursery in Germany. Now not only is this plant widely propagated vegetatively, there is also generative progeny (nursery M. Kiessling/Germany), which has taken a wonderful way with the white flower. These plants are horticulturally interesting and we therefore give the cultivar the name *Echinocereus fitchii* ssp. *albertii* cv. ‘Margaret’ cultivar nov. (Fig. 12).

This cultivar differs from the typical ssp. *albertii* only in the white flower with greenish throat. The epithet honors Dr. Margaret Land, Kingsville, Texas, USA, widow of Dr. R.O. Albert, for providing assistance and hospitality to the author. The name Margaret (which means being mother of pearl) also symbolises the pearl-white color and splendor of the flowers of this plant.

### Discussion

A description of the morphological characteristics of plants from the type population only on the basis of some photos hardly captures any natural variation, so one should first refer to the brief, original description



**11.** *Echinocereus fitchii* ssp. *albertii* Refugio County: F1 generation in fruit ex Poole & Price 2004-0183-1000.

and the holotype (L.D. Benson 1969).

The attempt to locate the type population near Alice/Jim Wells County in March 2012 was unsuccessful in spite of the friendly cooperation of the owner of the most promising area. However, this does not necessarily mean that the type population is lost. In order to obtain clarity on the status of the type habitat and the fate of a fully intact population of several thousand plants known in 1985, the authors request help from cactus enthusiasts. As a substitute, plants of historical collections, or their offspring, are urgently requested by the authors for a careful combined morphological and genetic study.

A special feature (U.S. FWS 1987: 6) of the population of the Kleberg County was turned out that: "... being most distinct. Plants ... differentiated from those in the other populations by having a larger stature and well developed central spines."

In fact, the current Refugio County population is considered deviant. Even the seedlings are distinguished by a more cylindrical growth, and the rarely produced central spines form a rather different plant character.

There are no additional insights about the location, size and condition of the McMullen County population (JLB 395) for the first time introduced to the public. If this is in fact the same location assigned



**12.** *Echinocereus fitchii* ssp. *albertii* cv. "Margaret", clone originated by K.-W. Beisel nursery. Inset: *E. fitchii* ssp. *albertii* cv. "Margaret" flower section, plant from seed raised by M. Kiessling nursery.

by Benson (1982: 667 probably misinterpreted as *E. reichenbachii* var. *reichenbachii* and unfortunately without any reference to a voucher)? Or, is McMullen County the home of both: *E. reichenbachii* (in the broad sense) and *E. fitchii* ssp. *albertii*?

Overall, the taxon *albertii* can be viewed against the background of one or more morphologically divergent populations; it is embedded in the species concept of *E. fitchii* with three well-differentiated subspecies and close relatives of *E. reichenbachii* as a suitable subject for the population genetics studies. Results, along with the desired clarity regarding the taxonomy, could be invaluable for supporting the conservation strategy and to maintaining genetic diversity. Although the ongoing efforts to store seeds at Desert Botanical Garden Phoenix (USFWS 2009: 6) or the author's efforts to breed several generations are appreciated, conservation work in general needs further support. Hopefully even such detailed investigations can provide first insights into bottleneck effects too.

The conservation management situation is currently still favorable in Refugio County, and interacts very strongly with the private commitment of the landowners, whom cannot be thanked enough. In contrast the population of the Kleberg County shrank

considerably, with the causes not clearly identified. This makes it more urgent to collect seeds and produce offspring, before there is a total loss. The Desert Botanical Garden in Phoenix/Arizona is already conducting this experiment (CPC 2012). Undoubtedly, it is absolutely necessary to assess the existence and condition of the type population near Alice!

The previous attempts to introduce *E. fitchii* ssp. *albertii* populations to other wildlife sites were based upon the activities of Dr. R.O. Albert. One of his experiments was conducted on the paternal farm in Duval County. At least two other trials in Jim Wells County were conducted. No data, written or verbal, exists regarding the localities in Jim Wells County however, while those planted in Duval County slowly died out without producing any offspring (Carr 2009). Even the Botanical Garden in Corpus Christi has not been able to successfully transplant wild or greenhouse-cultivated plants and seedlings to their outdoor cactus garden (USFWS 2009: 6).

Let's finish this paper with a citation out of the Recovery Plan (USFWS 1987: iii):

*“The major steps needed to met the recovery criteria include: enforcing existing Federal and State endangered species laws, obtaining management rights and long term protection for essential habitat, developing and implementing habitat management plans, searching for unknown populations, initiating population biology and ecology studies, locating potential habitat for establishing new populations, establishing populations at botanical gardens, and developing public support for preservation of the black lace cactus.”*

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