

A New Taxon of *Echinocereus* in Arizona

Wolfgang Blum, Traute & Jörn Oldach (Germany)

Summary

Since the mid-1980s, the authors study *Echinocereus* species with red flowers in Arizona, New Mexico and Texas. In this article, they are working on specific forms of central Arizona, north-western Arizona and southwest Utah. Here, the differences between *E. canyonensis* and a similar taxon are investigated.

Introduction

After the first named author published the *Echinocereus* monograph in 1998 with co-authors MICHAEL LANGE, WERNER RISCHER and JÜRGEN RUTOW, members of the *Echinocereus* study team contributed to new conclusions, which were subsequently published by different authors. Thanks to the first descriptions of *E. santaritensis* and *E. arizonicus* subsp. *nigrihorridispinus* - both of W. BLUM & J. RUTOW - and the subsequent description of *E. yavapaiensis* by MARC A. BAKER, we could set clearer boundaries within the red flowered *Echinocereus* of Arizona. We could clarify that *E. canyonensis* and *E. toroweapensis* are clearly identical. The habitat of *E. canyonensis* is very limited, regions of the counties of Mohave and Coconino, on both banks of the Colorado River, centred in Supai. The two typical sites of *E. canyonensis* and *E. toroweapensis* are both about 40 km to the east and west of Supai.

L. BENSON denominates these three taxa as *E. triglochidiatus* var. *melanocanthus* or var. *neomexicanus*. According to the current state of knowledge, this is a group of very different taxa. Under this collective name, there were taxa now known and accepted as :

- *polyacanthus* G. Engelmann
- *coccineus* G. Engelmann subsp. *coccineus*
- *coccineus* subsp. *roemeri* (P.A.F. Muehlenpfordt) W. Blum, M. Lange & J. Rutow
- *coccineus* subsp. *rosei* (E.O. Wooton & P.C. Standley) W. Blum, J. Rutow
- *canyonensis* E.U. Clover & M.L. Jotter
- *santaritensis* W. Blum & J. Rutow
- *yavapaiensis* M.A. Baker
- *arizonicus* J.N. Rose ex C.R. Orcutt subsp. *nigrihorridispinus* W. Blum & J. Rutow

The current study examines specimens of *Echinocereus* "coccineus" blooming red in the central region and the north-western Arizona and in the southwest of the neighboring Utah, with the distinctly differing criteria of *E. canyonensis*.



Comparing: left: *E. bakeri*;

right: *E. canyonensis*

***Echinocereus bakeri* W. Blum, Traute & Joern Oldach spec. nov.**

Holotype

USA, Arizona, Yavapai County, Collector: Marc A. Baker 13930, 18 March 2001, Yavapai Co., north of Clarkdale, 1065 m NN, [ASU0076433]

Isotype

USA, Arizona, Yavapai County, Collector: Marc A. Baker 13930, 18 March 2001, Yavapai Co., north of Clarkdale, 1065 m NN, [US 01095080]

Paratypes

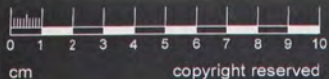
USA, Arizona, Yavapai County, Collector: Marc A. Baker 11740, 22 April 1995, north of Clarkdale, 1094m

[ASU0076412]

USA, Arizona, Yavapai County, Collector: Marc A. Baker 11757, 22 April 1995, north of Clarkdale, 1091m [ASU0076424]

USA, Arizona, Yavapai County, Collector: Marc A. Baker 13929, 18 March 2001, north of Clarkdale, 1065m [ASU0076434]

USA, Arizona, Yavapai County, Collector: Marc A. Baker 11757, 22 April 1995, north of Clarkdale, 1091m [DES 0054744]



ASU

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! Cited in Baker et al. 2009. *Haseltonia* 15: p. 14.

Arizona State University (ASU)
Echinocereus coccineus Engelman subsp. *coccineus*
M. A. Baker November 2008

CACTACEAE OF ARIZONA
Yavapai County

Echinocereus coccineus Engelm.

Clarkdale Quadrangle:
1065m (3,500') elevation; along
Verde River
north of Clarkdale; west-facing basalt
boulders outcroppings and cliffs with *Acroetia wrightii*, *Aloesia
wrightii*, *Aristida purpurea*, *Berberis haematocarpa*, *Bouteloua
curtipendula*, *Bouteloua eriopoda*, *Echinocereus engelmannii*,
Gutierrezia sarothrae, *Hilaria belangeri*, *Juniperus
coahuilensis*, *Krameria erecta*, *Lycium exsertum*, *Opuntia
chihuensis*, *Opuntia engelmannii*, *Opuntia phaeocantha*,
Prosopis velutina, and *Tipialia canescens*.
Common and locally abundant creosote perennial; n=22
(counted during meiosis of microsporogenesis); priests.

Marc A. Baker 13930

18 March 2001

Specimens entered
in ASU Database

ASU Molecular Plant Herbarium
Department of Botany



ASU0076433

***Echinocereus bakeri*: Holotype:** Herbarium Arizona State University, Collector: MARC A. BAKER 13930, Arizona, Yavapai Co., north of Clarkdale, 1065 m NN, [ASU 0076433]
<http://swbiodiversity.org/imglib/seinet/ASU/201312/ASU0076433.jpg>

Etymology

Was named in honour of MARC A. BAKER, which due to its field research, has contributed to a better understanding of the genus *Echinocereus* in the United States.

Characteristic criteria:

- *E. bakeri* already takes shape at a juvenile stage, *canyonensis* takes shape significantly later.

-Number of ribs: *E. bakeri* 9-11, *E. canyonensis* 11-14

-Number of of radial spines: *E. bakeri* 7-11, *E. canyonensis* 9-13

-Number of central spines: *E. bakeri* 1-2, rarely 3-4, *E. canyonensis* 4-7

-Flower length: *E. bakeri* 50-70 mm, diameter 35-45 mm,

- Flower length: *E. canyonensis* 30-45 mm, diameter 15-35mm,

-Nectar chamber length: *E. bakeri* 6-9 mm, *E. canyonensis* 2,5-6mm.

Taxon	<i>canyonensis</i>	<i>bakeri</i>
STEM		
shape:	forming clumps, -30 stems, cylindrical,erect	forming clumps - cushions, - 500 stems, ovate - cylindrical, erect
height / diameter:	150 - 400 / 40 - 70	130 - 300 / 40 - 50
epidermiscolour:	darkgreen	darkgreen
ribshape:	slightbumps	slightbumps
rib number:	11 - 14	9 - 11
width / height / distance:	5 - 15 / 7 - 12 / 10 - 20	5 - 15 / 5 - 10 / 10 - 15
root:	fibrous, branched	fibrous, branched
peculiarities	significantly later clumping	sprouts even as a very young plant
SPINATION		
areole shape:	round - oval	round
length / width / distance:	4 - 6 / 3 - 5 / 10 - 20	3 - 5 / 3 - 5 / 8 - 20
radials: number / length:	9 - 13 / 10 - 40	7 - 11 / 5 - 30
radials: colour:	white - yellow, becoming grey	white, becoming grey
radials: arrangement / shape:	adpressed - slightly projecting, spreading / needle-like, straight	adpressed - slightly projecting, spreading / needle-like, straight
centrals: number / length:	4 - 7 / 20 - 80	1 - 2 (rarely 3, occasionally also by 4/ 20 - 45
centrals: colour:	white - reddish-black, becoming grey	yellow-brown, becominggrey
centrals: arrangement / shape:	projecting, spreading / stiff, straight, slightly angular	projecting, spreading / stiff, straight, slightly angular
Trichoms: stem / fruitspines	no, strigil (SEM, Oldach 12/2014)	striate, with incipient trichom formation (SEM, Oldach 12/2014)
FLOWER		
flower bud:	rounded, red, spined and felty	rounded, red, spined and felty
flower shape:	short-tabular	extended short-tabular
flower: length / diameter:	30 - 45 / 15 - 35	50 - 70 / 35 - 45
flower colour:	red, rarely pink, yellow throat	red, with a bluish tinge, rarely pink - purple, yellow throat

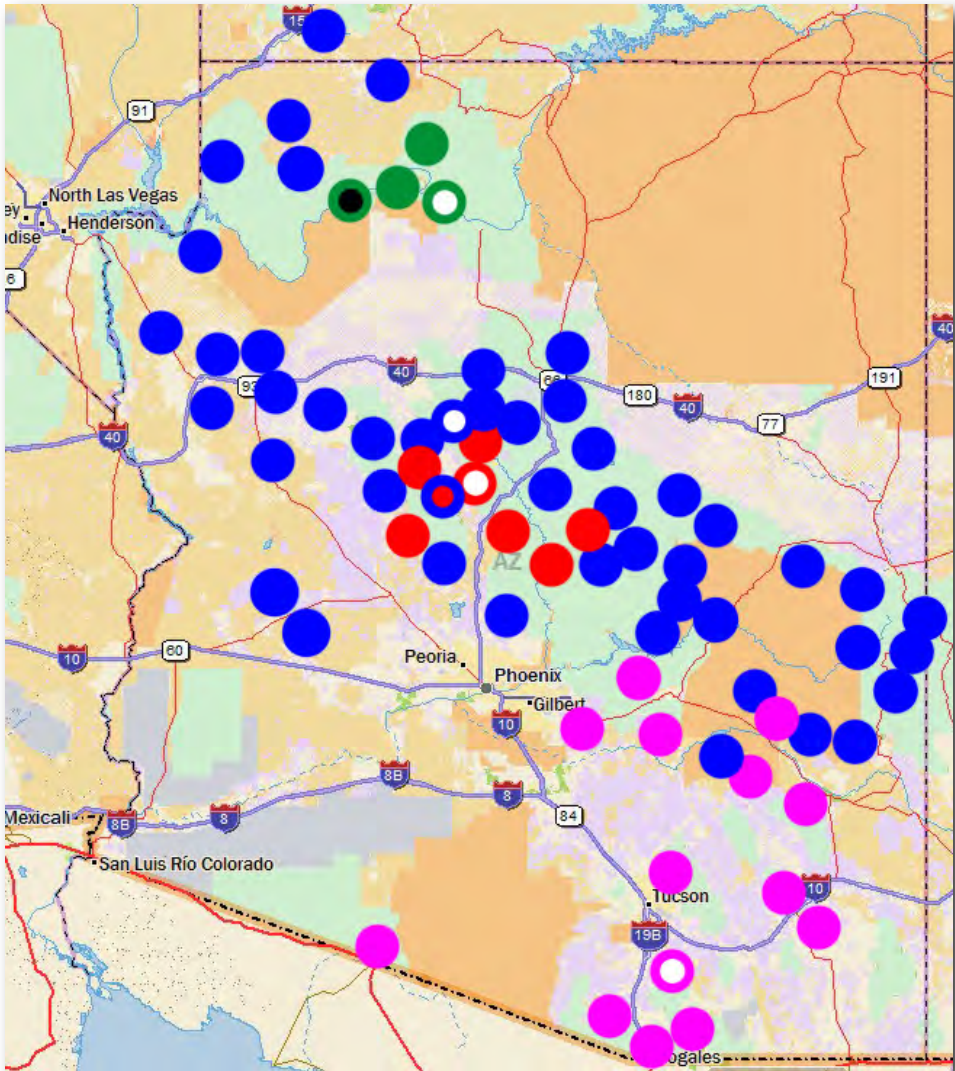
tube: length / diameter:	12 - 35 / 9 - 20	20 - 40 / 15 - 20
tube colour:	reddish - brownish	dark green - reddish - brownish
ovary: length / diameter:	8 - 15 / 8 - 13	15 - 20 / 10 - 15
ovary colour:	darkgreen	darkgreen
spines: number / length:	7 - 15 / 7 - 10	12 - 15 / 7 - 10
colour:	white, darktipped	yellow - brown, darktipped
wool length:	- 2	- 2
petals: length / width:	14 - 18 / - 8	14 - 25 / - 10
nectar chamber: length / width:	2,5 - 6 / 3 - 4	6 - 9 / 2 - 3
filaments: length / colour:	10 - 35 / white, light pink top - dark pink	12 - 40 / white, light pink top - dark pink
anther colour / pollen colour:	purple / yellow	purple / yellow
style: length / width / colour:	20 - 40 / 2 / greenish	48 - 60 / 1,5 / yellowy - greenish
stigma lobes: number / colour:	5 - 10 / 3 - 5 / green	7 - 12 / 4 - 6 / green
peculiarity:	dioecious	dioecious und gynodioecious
FRUIT		
shape / maturity time:	oval / 1,5 - 2,0months	oval - round / 2 - 3months
fruit: length / diameter:	15 - 25 / 12 - 20	20 - 30 / 15 - 20
fruit colour:	green - dark green, yellowish - brownish drying up	purple brown - orange - rarely pink
pulp:	white	white
peculiarity:	laterally along tearing up	laterally along tearing up
SEEDS		
length / width / colour:	1,25 - 1,4 / 1,0 - 1,2 / black	1,4 - 1,6 / 1,2 - 1,4 / black
microstructure:	testa perforated with cell lines of connecting	testa perforated with cell lines of connecting
wart form:	flat - convex	convex
cuticle:	clearly visible cuticular folding pattern	clearly visible cuticular folding pattern
chromosome number:	tetraploid(n = 22)	tetraploid(n = 22)
HABIAT		
terrain / soil:	rocky with clayey - sandy material, and humus pockets	grassland with bushes - with stony gravel soil, humus pockets
height:	685 - 1775 m NN	500 - 2450 m NN
range:	USA: Arizona: SE. Mohave Co.: Toroweap Point, W. Coconino Co.: Bass Cable, Supai, and Fishtail Mesa	USA: Arizona: S. Coconino-, Gila-, Graham-, Greenlee-, E. La Paz-, Mohave-, S. Navajo and Yavapai Counties Utah: Washington County

Diagnosis (English)

- *bakeri* sprouts even as a very young plant, *canyonensis* clumping later
- Less ribs: *E. bakeri* 9 - 11, *E. canyonensis* 11 - 14
- Average less radial spines: *E. bakeri* 7 - 11, *E. canyonensis* 9 - 13
- Less central spines: *E. bakeri* 1 - 2, rarely 3 - 4, *E. canyonensis* 4 - 7
- The constant larger flowers: *E. bakeri* 50 - 70mm long, 35 - 45mm in diameter,

E. canyonensis 30 - 45mm long, 15 - 35mm in diameter

-The larger nectar chamber: *E. bakeri* 6-9mm long, *E. canyonensis* 2.5 to 6mm long



Distribution of members of the *E. coccineus* group in Arizona

white dot = type localities

pink spot = *Echinocereus santaritensis* W. Blum & J. Rutow

red spot = *Echinocereus yavapaiensis* Marc A. Baker

blue spot = *Echinocereus bakeri* W. Blum and Traute & Joern Oldach

blue spot with red dot = *E. bakeri* x *E. yavapaiensis*

green spot = *Echinocereus canyonensis* E. Clover & L. Jotter

[green spot with black dot is synonym of *E. toroweapensis* (P.C. Fisher) Fuersch]



E. bakeri, male flowers, mid-April 2014



E. bakeri, female flowers, mid-April 2014



Echinocereus bakeri



E. bakeri, flower cut, mid-April 2014



E. bakeri, fruit cut, mid-June 2014



Echinocereus bakeri

Currently, we know a place where *E. yavapaiensis* and *E. bakeri* hybridize. The plants of this site, as evidence MARC A. BAKER (MAB 14,367.2) are pentaploid and also produce seeds, following MARC. This population of Bradshaw Mountains in Yavapai County is located in the centre of the range of *E. yavapaiensis*.

We don't know of any other hybrid between *E. bakeri* and other *Echinocereus* taxa, although they grow almost anywhere in the immediate vicinity. In parallel and regarding *E. canyonensis*, there are multiple sites where hybrids were recorded with *E. engelmannii* (Engelmann) C.A. Lemaire.

Text & photos: Wolfgang Blum, Traute & Jörn Oldach

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ASC (Deaver Herbarium Biological Sciences Department Northern Arizona University P.O. Box

5640 Flagstaff, Arizona 86011-5640 U.S.A.)

ASU (Herbarium School of Life Sciences Arizona State University P.O. Box 874501 Tempe, Arizona 85287-4501 U.S.A.)

DES (Herbarium Research Department Desert Botanical Garden 1201 North Galvin Parkway Phoenix, Arizona 85008 U.S.A.)

GCNP (Museum Collection Herbarium Grand Canyon National Park P.O. Box 129 Grand Canyon, Arizona 86023-0129 U.S.A.)

MNA (Walter B. McDougall Herbarium Museum of Northern Arizona 3101 North Fort Valley Road Flagstaff, Arizona 86001 U.S.A.).

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