

150. *Opuntia engelmannii* Salm-Dyck in Engelmann, Bost. Journ. Nat. Hist. 6: 207. 1850.

- Opuntia engelmannii cyclodes* Engelmann, Proc. Amer. Acad. 3: 291. 1856.  
*Opuntia lindheimeri cyclodes* Coulter, Contr. U. S. Nat. Herb. 3: 422. 1896.  
*Opuntia dillei* Griffiths, Rep. Mo. Bot. Gard. 20: 82. 1909.  
*Opuntia arizonica* Griffiths, Rep. Mo. Bot. Gard. 20: 93. 1909.  
*Opuntia wootonii* Griffiths, Rep. Mo. Bot. Gard. 21: 171. 1910.  
*Opuntia cyclodes* Rose, Contr. U. S. Nat. Herb. 13: 309. 1911.  
*Opuntia gregoriana* Griffiths, Rep. Mo. Bot. Gard. 22: 26. 1912.  
*Opuntia valida* Griffiths, Proc. Biol. Soc. Washington 27: 24. 1914.  
*Opuntia confusa* Griffiths, Proc. Biol. Soc. Washington 27: 28. 1914.  
*Opuntia magnarenensis* Griffiths, Proc. Biol. Soc. Washington 29: 9. 1916.  
*Opuntia expansa* Griffiths, Proc. Biol. Soc. Washington 29: 14. 1916.

Originally described as erect and up to 2 meters high, but more properly a widely spreading bush, usually without a definite trunk; joints oblong to orbicular, 2 to 3 dm. long, thick, pale green; areoles distant, becoming large and bulging; spines usually more or less white, with dark red or brownish bases and sometimes with black tips, usually 3 or 4, sometimes only 1, or entirely wanting from the lower areoles, but on old joints 10 or more, usually somewhat porrect or a little spreading, but never reflexed, the larger ones much flattened, the longest one 5 cm. long; leaves subulate, about 15 mm. long; glochids numerous, brown with yellowish tips; flowers large, yellow; fruit 3.5 to 4 cm. long, red; seeds small, 3 to 4 mm. broad.

*Type locality:* From El Paso to Chihuahua.

*Distribution:* Chihuahua, Durango, Sonora, Arizona, New Mexico, and Texas.

An examination of the plant collected by Wislizenus (No. 223) north of Chihuahua, now in the herbarium of the Missouri Botanical Garden and labeled by Dr. Engelmann as *O. engelmannii* Salm-Dyck, shows that this species is of Schumann's series *Fulvispinosae* (our series *Phaeacanthae*) rather than series *Tunae*.

*Opuntia engelmannii* has been more confused than any other species of *Opuntia*. Salm-Dyck, who first studied the species, doubtless had but a single specimen before him, and this or a duplicate is now in the herbarium of the Missouri Botanical Garden. This type specimen came from near Chihuahua City, from which place Dr. Rose has collected identical material. Dr. Engelmann, who published Salm-Dyck's name, described the plant as erect and 5 to 6 feet high, giving its range from Chihuahua City to Texas. These remarks of his were doubtless based on notes of Dr. Wislizenus, who collected the type, and must have included more than one species; as Engelmann says it is both cultivated and wild, the cultivated plants doubtless referring to some of the many forms grown about towns and ranches. In 1852 Engelmann extends the distribution of the species westward to the Pacific Ocean, referring especially to a San Diego specimen. In 1856 he refers here his previously described species *O. lindheimeri*, and extends the range eastward to the mouth of the Rio Grande and to lower Mexico. Coulter brought all this material together under *O. lindheimeri* and four varieties.

An examination of herbarium and greenhouse specimens shows that at least half a dozen species have been passing under the name of *O. engelmannii*. While certain varieties and specimens are evidently to be excluded from the species, we are still uncertain as to its specific limits. It is quite common about Chihuahua City and extends to Monterey and Saltillo or is represented there by a near ally, while Mr. E. O. Wooton would refer here plants of southern New Mexico, and we are including large, bushy opuntias from Arizona.

Dr. Rose was inclined at one time to separate the Tucson plant, which seems to have some just claims for specific recognition, but there is a mass of herbarium material which seems to connect this with the true *O. engelmannii*.

*Opuntia engelmannii monstrosa* (Cat. Darrah Succ. Manchester 54. 1908) is doubtless one of the abnormal forms so common among the flat-jointed opuntias.

*Opuntia cyclodes*, first found by Bigelow near Anton Chico, New Mexico, is certainly of this relationship. The characters of orbicular joints, of small fruit and of stout, usually solitary spines, originally assigned to it, are not constant, for it often has obovate to oblong joints bearing as many as four slender spines and large fruit.

In 1913 Dr. Rose explored the upper Pecos, especially about Anton Chico, near the type locality, where he collected specimens similar to the Bigelow plant, but these grade into more spiny forms, some bearing as many as five spines at an areole, usually yellow, especially distally, and more slender than in typical *O. engelmannii*. From the same type locality, and associated with *O. cyclodes*, is *O. expansa* Griffiths, which has more and whiter spines than the typical form, although they are sometimes yellowish with brown bases. *O. dillei* Griffiths is also related to *O. cyclodes*, but the spines are fewer; Dr. Griffiths states, however, that more spines develop on cultivated plants.

*Illustrations*: Pac. R. Rep. 4: pl. 8, f. 1; pl. 22, f. 8, 9, all as *Opuntia engelmannii cyclodes*; Rep. Mo. Bot. Gard. 20: pl. 4, in part, as *Opuntia dillei*. Ariz. Agr. Exp. Sta. Bull. 67: pl. 7, f. 1; Rep. Mo. Bot. Gard. 20: pl. 10; Safford, Ann. Rep. Smiths. Inst. 1908: pl. 10, f. 3, 6, all as *Opuntia arizonica*. Rep. Mo. Bot. Gard. 21: pl. 26, in part, 27, both as *Opuntia wootonii*. Rep. Mo. Bot. Gard. 22: pl. 3, this last as *Opuntia gregoriana*. Standley, Ann. Rep. Smiths. Inst. 1911: pl. 2; Bull. Torr. Club 32: pl. 10, f. 10 to 13; Cact. Journ. 2: 147; Cact. Mex. Bound. pl. 75, f. 1 to 4; Cycl. Amer. Hort. Bailey 3: f. 1547; Gard. Chron. III. 30: f. 123; N. Mex. Agr. Exp. Sta. Bull. 78: pl. [5, 6].

Plate xxv, figure 3, represents a flowering joint of a plant sent from Arizona by Dr. MacDougal in 1902.