Geophytic *Euphorbia* from Chile (part 1)

by Wolfgang Ewest

In the nineteenth century Rodolfo Amando (born Rudolph Amandus) Philippi described three *Euphorbia* species from the arid regions at the southern border of the Atacama desert: *Euphorbia copiapina*, *E. thinophila*, and *E. porphyrantha*. After several years of research conducted during private visits to Chile from 1997 to 2013, I come to the conclusion that some additions are necessary.

The area studied extends along the coast from close to Choros Bajo to Taltal, and from the coast up to 150 km inland. It is situated at the northern border of the winter rain area. Farther south at La Serena rains fall fairly regularly. The farther to the north, the less rain falls and less regular. Beyond Choros Bajo it does not rain every year. For instance, at Copiapó, the period without rain may vary from 3 to 10 years.

When there is any rainfall, it is usually limited to a single day (or 3 days at most). Precipitation may vary from a few millimeters up to about 80 mm during a "rain of the century" event, according to weather recordings for the 20th century from Copiapó. A comparison of these recordings from Copiapó and the occurrence of el Niño does not yield any correlation between precipitation and el Niño or la Niña years. Climatic conditions in the northern part (Chañaral to Taltal) have extensively been outlined by Johnston (1929) and Rundel et al. (1996).

The stretch of land along the coast up to 20 km inland is regularly covered by low stratus cloud-banks ("camanchaca") at 200+ m altitude during the whole year, especially in the early morning hours – without any precipitation. Because of the "camanchaca" coastal habitats are often dull and without sunshine. Temperatures remain below 20 degrees Celsius during the day-light hours. Under these conditions the soil remains moist for quite some time (maybe even weeks?) after a good rain. Only in the valleys of the Rio Huasco, Rio Copiapó and around Chañaral, these fogs sometimes extend much farther inland during the morning hours.

Fig. 1: Euphorbia porphyrantha, *syntype, SGO-Nr. 051581*

It is worth noting however, that adult specimens of the above named species can survive several years of continuous drought in habitat without any problem.

The first two species named – *Euphorbia copiapina*, *E. thinophila* – are easy to find. Nevertheless it should be noted that you can find all these geophytic euphorbias only after a good rain fall. From my experience I would estimate that at least 10 mm of rain are required. These geophytic euphorbias are not "fog-fed plants". In years without any rain they do not develop new herbaceous shoots despite the coastal fogs. During droughts any shoots above soil dry back completely and are blown away by the wind. Specimens persist below the soil only and thus cannot be found. That is why I expect more localities with these euphorbias will be found in this area.

Euphorbia porphyrantha Phil.

Anales Univ. Chile 91: 510 (1895)

There are two localities given in the original description of *Euphorbia porphyrantha*: Finca de Chañaral und Huasco. With these there are also 4 sheets preserved in the herbarium in Santiago (seen!) – numbers 051581 and 040771 from the locality of Finca de Chañaral, and numbers 051585 and 040773 from the Huasco locality.

According to the description by Philippi the specimens from Finca de Chañaral had originally been named *Euphorbia pechuguilla* by their collector Francisco San Ramon (*pechuguilla* means "small chicken breast", which might be the vernacular name of the plant). However, he never used the name *Euphorbia pechuguilla* for a description. Instead, Philippi used this collection as a syntype of *E. porphyrantha*. On Number 040771 both *E. pechuguilla* and *E. porphyrantha* are written. The collections from Huasco had been made by R. A. Philippi's son Federico Philippi.

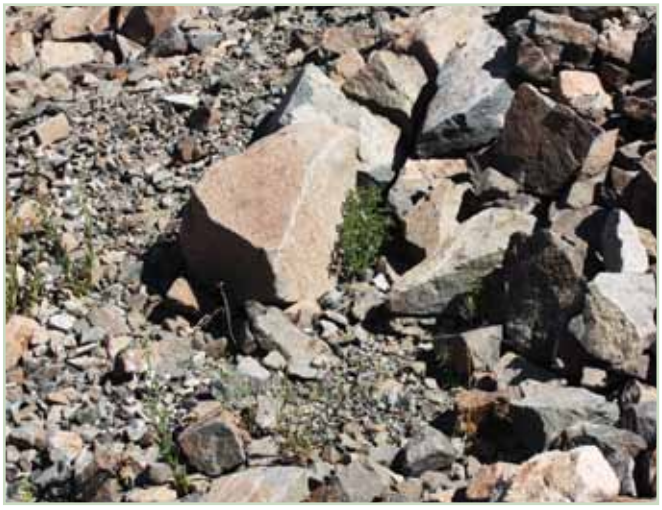

Fig. 2: Euphorbia porphyrantha, *habitat near Finca de Chañaral*

Fig. 3: Euphorbia porphyrantha, *near Finca de Chañaral after a good rain*

During several years of research into *Euphorbia porphyrantha* in the vicinity of Huasco I found two specimens that may be interpreted as *E. porphyrantha* once dried. However, when living both forms differed considerably and represent different taxa. Especially the structural pattern of the roots is different. For further details see below.

In 2002 I found a specimen in the immediate vicinity of the Finca de Chañaral (WE 152 = Santiago: 149097). This specimen clearly matches Philippi's number 051581 (Fig. 1) with regard to shape of leaves, root and habit. This is especially relevant as parts of the root have been mounted on his sheet number 051581, while the other three sheets only show shoots. Therefore, I consider the specimen from Finca de Chañaral to be the true *E. porphyrantha*. Of course, only genetical analysis of all four original sheets could yield final clarification here.

Another collection of *E. porphyrantha* (Eggli & Leuenberger 1811 = SGO 145759, seen!) has been made around Copiapó, while no specimens could be found in the vicinity of Huasco that correspond to those of the Finca de Chañaral locality.

E. porphyrantha usually is monoecious, with female flowers appearing prior to the male ones. It is a perennial plant with annual shoots. It prefers habitats with coarse stones (Fig. 2) in mountains further inland. These regions – more than 80 km away from the coast – usually do not receive any coastal fog or coastal rains. According to Latorre et al. (2002) they are still inside the area of winter rainfall. Rains, however, have a rather restricted character and only occur very rarely.

I have found this taxon at three localities in the vicinity of Finca de Chañaral at 1490 m a.s.l. (Fig. 3) and close to Copiapó at 780 m (Fig. 4). It only grows in plains of more or less large stones that are somewhat loosely packed, allowing water to percolate or to gather in certain places. I have not found it in a compact substrate.

The number (1-5) and length (2-15 cm) of thin (2-5 mm in diameter) annual shoots above soil relates to the availability of rain in *E. porphyrantha* (Figs 3,

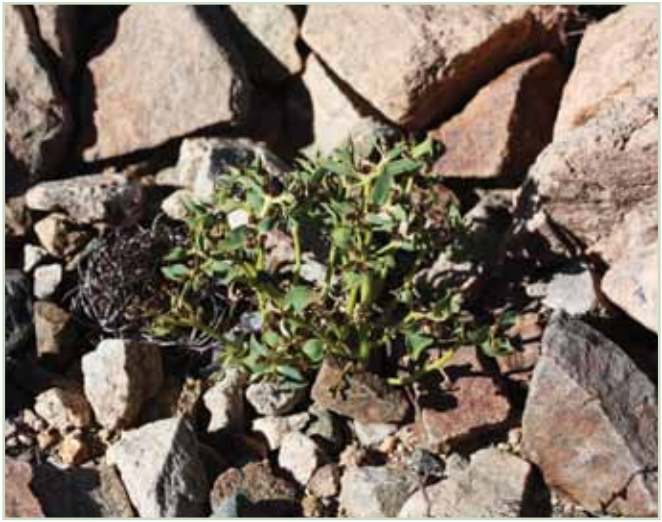

Fig. 4: Euphorbia porphyrantha, *near Copiapó*

Fig. 5: Euphorbia porphyrantha, *in a period of little rain*

Fig. 6: Euphorbia porphyrantha *with dried remnants of past growth periods*

Fig. 7: Roots of Euphorbia porphyrantha *from Finca de Chañaral*

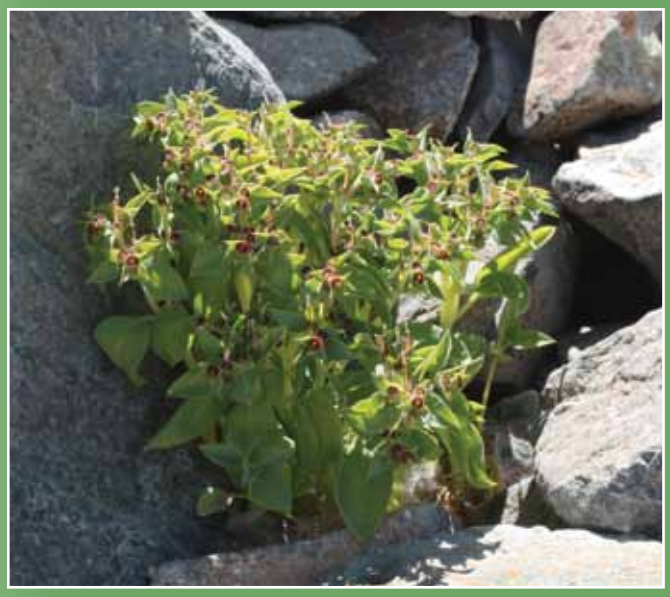

Fig. 8: Euphorbia porphyrantha *in full leaves*

Fig. 9: Cymes of Euphorbia porphyrantha

Fig. 10: Cyathia of Euphorbia porphyrantha

Fig. 11: Seeds of Euphorbia porphyrantha