In Japan the southern distribution of *P. macroceras* shows a similar pattern. With an isolated site in the Mie prefecture and one or two isolated sites on Shikoku Island, its range extends to 34 degrees N. latitude. It appears that the specimens at these southern Japanese sites have some morphological similarities with subspecies *nortensis*. Due to suitable microclimatic conditions in shady, seepy, and often vertical rocky sites most southern *P. macroceras* populations on both sides of the Pacific are very petrophilous. Their serpentine or basalt habitats are quite similar to the calcareous habitats of the European *P. longifolia* and *P. vallisneriifolia* group.

The type of pubescence noted on the lower lip and within the corolla tube are extensively elaborated upon because they are believed to have taxonomic significance, as noted earlier by several authors (*Sprengel* 1825; *Ernst* 1961; *Wood & Godfrey* 1957; *Godfrey & Stripling* 1961; *Casper* 1966). A microscopic review of this feature in 1995 indicated that the pubescence, especially in the throat region, did vary significantly from that illustrated by *Casper* (1966) for *P. macroceras* (*Rondeau* 1995).

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## *Pinguicula crystallina* in SE Turkey

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*Pinguicula crystallina* is a European evergreen subtropical species distributed predominantly in the Troodos mountains in West Cyprus and has sometimes been considered endemic to Cyprus. However, it has also been collected very rarely in the past from the coastal region of S.E. Turkey, though the German herbarium material was destroyed in World War II.

During my holiday in 1991 I rediscovered this isolated population in the SE tip of Turkey at a site which is not more than 300km from that in Cyprus. During October I camped with my friends by the eastern coast of Iskenderun bay ca. 10 km south of the small district town of Uluçinar and ca. 40 km north of the Syrian border. Close by was the small fishing village of Konaçik in the foothills of the steep mountain chain known as Nur Dağlari. The mountain peaks rise to over 1500m as close as 2-3 km from the coast. Iskenderun bay belongs to the warmest parts of the Mediterranean Sea, with summer temperatures at the coast between 35-40C, falling to around 10C in winter.

About 1 km beyond the village we set out along a dry river bed or "vádi" heading eastward toward the mountains. The stony river bed narrowed and a stream appeared at the surface after about a half km which gradually got stronger. It became evident later on that the stream flows through a deep mountain valley, clearly visible from the coast. Two kilometres from the coast the stream had cut a deep and very narrow pass and it became very dangerous as we had to climb over rocks or along water pipes going along the pass. The pass came to an abrupt end about 2.5 km from the coast at an altitude of about 250m where we were met by a 5 metre high waterfall plunging into a deep pool. The pool was almost completely surrounded by vertical rock walls. Two of these walls were clothed with typical butterwort rosettes, the outline of the leaf-tips unmistakable as *P. crystallina*. Adult plants have a rosette diameter between 7-8 cm and much resemble the better known *P. primuliflora*. Only one plant was still in flower.

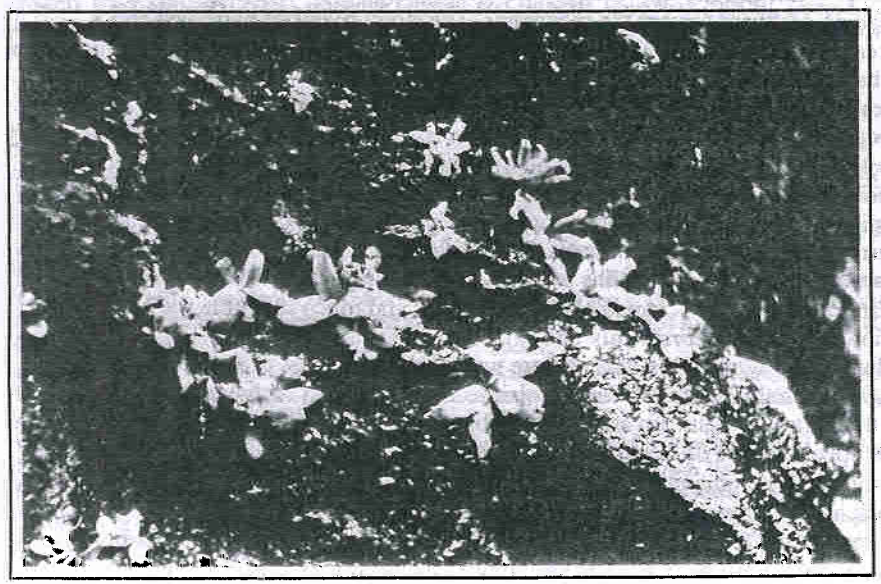
Here in this remarkable habitat there were just two stands with a total of between 500-1000 individuals. My friends claimed they had seen such plants on rocks a little further downstream and it is possible that it also occurs more abundantly in the upper reaches of the stream above the waterfall. Water trickled through the stands so that some plants had permanently wet leaves. The plants grew on the rock in a thin layer ( 10-15mm) of humus.Their fibrous roots were only 10-15mm long. The rock substratum was basaltic so it can be assumed that both water and humus were neutral. Growing in the deep dark pass, it is probable that the plants are never exposed to direct sunlight, and I estimate that only about 10-20% of the full irradiance penetrated to the level of the plants.

We can consider *P crystallina* to be a very hygrophilous and rather sciophilous species, tolerant of only moderate fluctuations in temperature on both a daily and seasonal basis.

*Pinguicula crystallina* is clearly a highly susceptible and very demanding species, for which it has proved difficult to prepare suitable conditions in the greenhouse. I found them short-lived in cultivation at the Institute of Botany in Trebon.The three adult plants I collected flowered in the first two years, though capsules did not develop. The plants grew poorly, even though the roots were up to 25mm long, the old leaves decayed rapidly. Unfortunately, these and the three juvenile plants collected all died within three years.

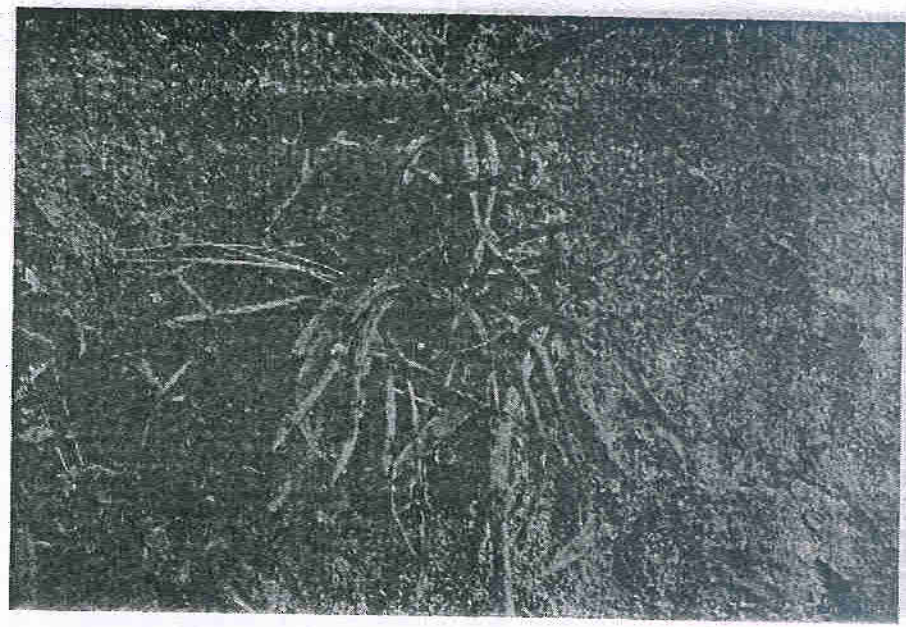
I used a moderately alkaline soil mixture of fen soil and ground limestone and kept the plants well shaded and frequently sprayed with tap water. The key to more successful cultivation might be to use a very thin soil through which fresh water is allowed to percolate continuously to ensure that there is always sufficient oxygen at the roots.

Should any readers visit the SE tip of Turkey it would be of great interest to further investigate the distribution of this species.



***Pinguicula crystallina*** in SE Turkey





***Pinguicula vallisneriifolia***
"Cerrada de Elias", Sierra de Segura.

top: plants growing on the side of the gorge.
bottom left: flower, front view
bottom right: flower, side view