Consolida samia – The deemed vanished endemic flower of Samos

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The truth is that it never disappeared nor, of course, reappeared. It was always there, on the rugged southwestern slopes of Kerkis, faithful like Persephone in her annual cycle of rising to the upper world in the spring and returning underground at the end of summer. We are referring to *Consolida samia* P.H. Davis, a small, annual plant (therophyte), endemic to Samos, with beautiful flowers in soft shades of lilac. The species is found in a single, limited population on Mount Kerketefs (Kerkis) in Samos, within the NATURA 2000 site coded GR4120003: Samos: Oros Kerketefs - Mikro kai Megalo Seitani - Dasos Kastanias kai Lekkas, Akr. Katavasis – Limenas. It is protected by the Presidential Decree 67/81 (1981), assessed in 2011 as Critically Endangered (CR) by the IUCN (International Union for Conservation of Nature), included in Appendix 1 (of strictly protected plant species) of the Bern Convention (1979), as well as in the "Top 50 Plants of the Mediterranean Islands" (2005, 2017); it is also one of the 25 Greek plants of Community Priority in the "Directive 92/43/EEC (Habitats Directive) on the conservation of natural habitats and of wild fauna and flora" (1992).

In short, it is a 'decorated' plant that until recently remained almost unknown. This is because after its initial discovery in 1962, no one had seen it again, despite vague reports of fluctuations in its population size (up to 100 individuals in 1962, 20 in 1975, 100 in 1995) giving the impression that the plant had been rediscovered. However, the (numerous over time) efforts to relocate it by both amateur nature enthusiasts and notable expert scientists (Dimitris Christodoulakis, Theophanis Konstantinidis, Arne Strid) had proven fruitless. Our great ignorance was further compounded by the absence of even a single photograph of a living plant and the lack of any information regarding the species' fruits and seeds.

But let's begin from the start. In 1957, the so-called Scandinavian School, with its first prominent representative being Hans Runemark (1927-2014), a professor at Lund University in Sweden, began its research on the flora of the Aegean Islands. Perhaps the most notable of Runemark's collaborators was fellow Swede Sven Snogerup (1929-2013), who was almost always accompanied on field missions by his colleague and wife Britt Snogerup (1934-). Professor Arne Strid (who later became a member of the Lund team and has since emerged as the 'dean' of researchers of Greek Flora in modern times) recalls many interesting details from Snogerup's own accounts, specifically for this article. Between May 22-28, 1962, a team from Lund University led by Runemark (consisting of about 5-6 researchers) conducted a botanical expedition to Samos, resulting in a total of 1,401 plant samples deposited in the Botanical Museum of Lund. These samples are now accessible digitally on the website of Sweden's Virtual Herbarium http://herbarium.emg.umu.se/. (Of course, when searching, one should be careful to look for Samos in Asia[...] but this, like the "Flora of Turkey," is a 'painful' topic for another article).

On this mission, Sven Snogerup was not accompanied by his wife, as they had just welcomed their only daughter, Sara Snogerup Linse (now a professor of Biochemistry at Lund University), at the end of April. For the botanical excursions, the team likely split into groups of 1-3 people, starting from the same base and following different routes. Dated May 26, 1962, there are 281 samples in the Lund Museum, all from the same area around the village of Agia Kiriaki, often labeled "N of Agia Kiriaki" (so it is likely the team had spent the previous night there). According to Strid, Snogerup, probably alone as an avid hiker (then 33 years old), chose the more mountainous part (where he even spent the following night in a natural hollow). Thus, there are about 70 of his plant samples labeled "SW-exposed cliffs of Mt Kerki, 800-1000 m, 26.5.1962," which include chasmophytes such as *Aurinia saxatilis*, *Brassica cretica*, *Dianthus zonatus*, *Paracaryum aucheri*, *Scrophularia heterophylla*, and *Silene gigantea*, as well as many others in rocky or low-vegetation habitats often found under steep slopes and screes.

Curiously though, among the aforementioned samples, *Consolida samia* is not included! What could be happening? In Davis' initial publication (1965), where the plant is described as a new species to science, there is a photograph of the five individuals collected by Snogerup (the only image we had of the species until its rediscovery), captioned "the holotype of *Consolida samia*" with the collection date of 26.5.1963! The same incorrect date is recorded in the digital archive of Sweden Herbaria (while there are no other collections from Samos in 1963) and in the digitized holotype, which includes three of Snogerup's five specimens. In contrast, the digitized isotype with the other two plants, kept by Davis in the Edinburgh Herbarium, shows the correct date of 26.5.1962. So, mistakes happen even in the best of families...

On a personal note, the rediscovery of *Consolida samia* became an obsession for me many years ago. This was partly due to my involvement in the ex situ and in situ conservation of Greek flora (as it was the only one of the 25 priority plants for which Greece had not been submitting data in the six-year reports of Article 17 of Directive 92/43 - a situation that will, of course, change in the upcoming 2024 report). Additionally, it stemmed from my first research project on the post-fire regeneration of Samos forests (1983), which brought me many times to the island's magnificent natural environment. The right opportunity came in 2021 when I learned about the Mohamed bin Zayed Species Conservation Fund (named after the then no. 2 and now no. 1 leader of the United Arab Emirates), which funds conservation actions for endangered plant and animal species worldwide with quick procedures and minimal bureaucracy (usually with $10,000). I wrote the proposal as the head of the National and Kapodistrian University of Athens Seed Bank, and two months after submission, the entire amount was approved and credited. Though small, it was enough to buy some extra batteries for our drone and to conduct 3-4 field missions to Samos. This two-year project, titled "Quest to rediscover *Consolida samia* - exploring the screes of Mt Kerketefs (Samos, Greece)", is in synergy with the major project "Monitoring and Evaluation of the Conservation Status of Flora Species of Community and National Interest in Greece" (of the Ministry of Environment and Energy with Scientific Coordinator Prof. Emer. Kyriacos Georghiou and responsible for *Consolida samia* being the author of this article) and with the project "Conserving the Flora of the Balkans: Native Plants of Greece" (in collaboration with and funded by the Royal Botanic Gardens, Kew, UK, with the author as the scientific coordinator).

The first attempt to rediscover the species began in early 2022. Planning such a mission presented numerous challenges, both in pinpointing the right time to find in bloom a tiny plant no more than 10 cm tall and in selecting the search area (given that Snogerup's reference to the NW slope of Mt Kerketefs is somewhat vague despite mentioning an altitude of 800 m). Collecting and analyzing meteorological data from 1960s until now, considering climate change, studying maps and routes, we scheduled the initial mission for late May 2022, aiming at a scree that appeared to align with all identified criteria.The mission was led by biologists Spyros Oikonomidis and Elias Dimitriadis, along with the local researcher of Samos flora, George Fakas. Unfortunately, despite the two-day effort, the route proved extremely difficult, and there wasn't enough time to search for the plant in the field. In 2023, we repeated the mission, led by one of the most capable field researchers and a distinguished plant 'hunter', our collaborator biologist Apostolis Kaltsis, accompanied by biologist Sofoklis Mouratidis and George Fakas. This time, on May 27, 2023, the effort was successful: the plant was found approximately where we calculated, although it appears to have spread from Snogerup's scree to the boulder at its base. We collected 2 herbarium samples and took dozens of photos of flowering plants, while attempting to assess the population and its occupancy area. During the next visit (July 3, 2023), it was found that the population amounted to approximately 1500 individuals, with plants observed in all stages of reproductive processes, attributed to the relatively cool and rainy June that intervened. Finally, fruits were collected, and about 2000 seeds are already stored in the NKUA Seed Bank.

Of course, we will repeat our expedition next year because, on the one hand, we must remember that this is an annual species whose population fluctuations from year to year can be enormous, and on the other hand, because there is much more to learn about *Consolida samia*. Indeed, the author of this article, who due to family reasons could not participate in 2023 expeditions, hopes to become the 6th person to see this beautiful plant in its natural habitat.

*****Note: In 2011, researchers from Manisa Celal Bayar University published a study reporting the discovery of a population of C*. samia* in a nearby area (Kocasivri Hill, Soma, Manisa, Turkey), located 200 km northeast of the locus classicus in a straight line, but without sufficient documentation and with data of questionable value. No further relevant publications followed this study, either from the original team of Turkish researchers or from other experts. Therefore, until (if ever) there is necessary scientific evidence confirming that it is indeed *Consolida samia* and not a related species, we will continue to consider *Consolida samia* as a local endemic plant of Samos.

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The team that rediscovered *Consolida samia* after 61 years (27.5.2023) is photographed near the locus classicus on Kerkis. From left: G. Fakas, A. Kaltsis, S. Mouratidis. (© S. Mouratidis & NKUA Seed Bank)

Cluster of *Consolida samia* plants in full bloom (3.7.2023) in their typically open and rocky habitat. (© A. Kaltsis & NKUA Seed Bank)

Successive stages of reproductive maturity, from left to right: closed immature flower buds, fully developed flowers, immature green follicle, nearly mature closed follicle with mature seeds, dry and open follicle with mature seeds (3.7.2023). Each square side measures 5 mm. (© S. Mouratidis & NKUA Seed Bank)

Left: 2 dried herbarium samples of *Consolida samia* with flowers and buds (collected on 26.5.2023), center (to scale): extreme parts of plants with mature, dry follicles (3.7.2023), and right: mature seeds. The small squares on the millimeter paper background have a side length of 1 mm. (©NKUA Seed Bank)