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New findings on the *Pinguicula hirtiflora-crystallina* aggregate in Albania and Greece

Jost Casper (Jena, Germany)
Juerg Steiger (Bern/Liebefeld, Switzerland)
Jan Schlauer (Frankfurt a.M., Gerrmany)

Presentation and all unmarked pictures by Juerg Steiger

Genus *Pinguicula*

Family and genus name created 1555/56 by the Swiss scholar Conrad Gessner for plants collected on Mount Pilatus (mons fractus, Fraktenmunt) near Lucerne, Switzerland:

- “Lentibullia vel Lentibullaria“ (from “lens“ and “bulla“)
- “Pinguicula vocitur, nam et pinguis et parva est“
- “Pinguicula, ut ficto a nobis nomine appellatur“

Original water colour painting by Conrad Gessner, showing *Pinguicula alpina and vulgaris,* 1555/56

University Library of Erlangen
Ms 2386, fol. 128

P. crystallina-hirtiflora history

- *P. crystallina* discovered 1787 in Cyprus by J. Sibthorp and F. Bauer.

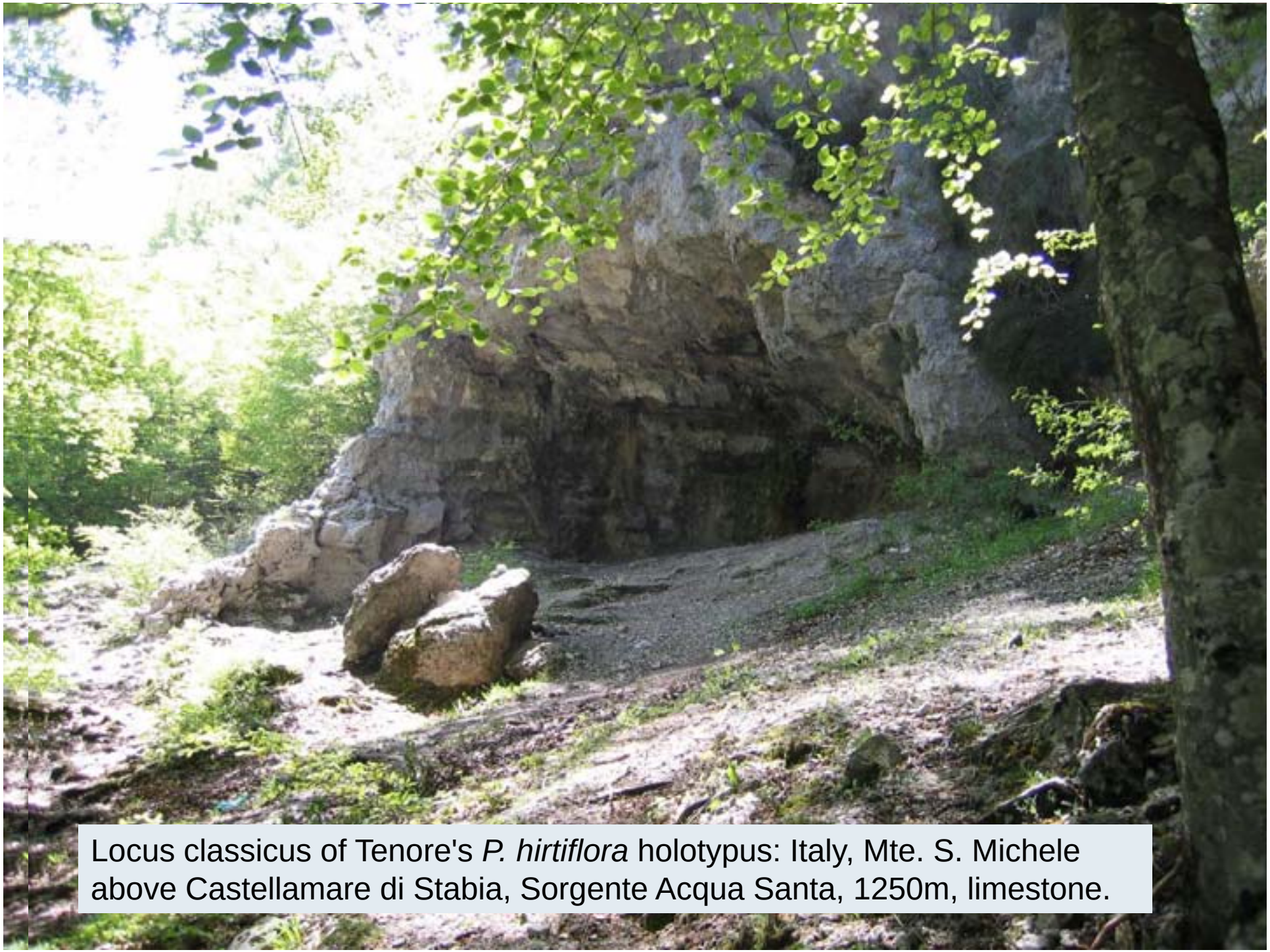
P. crystallina

Coloured engraving by J. Sowerby based on a water colour sketch by the Austrian draughtsman F. Bauer (companion of J. Sibthorp). Flora Graeca Vol. 1 Tab. 11 (London 1806)

Photograph: University of Göttingen

P. crystallina-hirtiflora history

- *P. crystallina* discovered 1787 in Cyprus by J. Sibthorp and F. Bauer.
- *P. hirtiflora* discovered 1811 in Italy by M. Tenore.



Locus classicus of Tenore's *P. hirtiflora* holotypus: Italy, Mte. S. Michele above Castellamare di Stabia, Sorgente Acqua Santa, 1250m, limestone.

P. hirtiflora **site at sea level, Italy, Vietri sul Mare, limestone tufa**

P. hirtiflora **site at sea level, Italy, Vietri sul Mare, limestone tufa**

P. hirtiflora, Italy, Vietri sul Mare, Marina di Vietri: site at sea level behind the "Calypso" bathing establishment; huge population just behind the restaurant (more than 2‘000 plants)


P. hirtiflora, Italy, Vietri sul Mare, sea level, limestone tufa

P. crystallina-hirtiflora history

- *P. crystallina* discovered 1787 in Cyprus by J. Sibthorp and F. Bauer.
- *P. hirtiflora* discovered 1811 in Italy by M. Tenore.
- Closely related species. *P. hirtiflora* often classified as *P. crystallina subsp. hirtiflora*. At present named *P. hirtiflora-crystallina* aggregate.


Distribution of the *P. hirtiflora-crystallina* aggregate
(north- eastern Greece and Turkey yet unclear)

P. crystallina-hirtiflora history cont.

Albania:

P. hirtiflora first reported 1841 by A. Grisebach.

In 1926 F. Markgraf described a long-spured *P. louisii*, which was classified by A. Ernst as *P. hirtiflora var. louisii* (1961).

Pinguicula hirtiflora var. hirtiflora
from four different sites in Albania

1. Grabomi (Lumi i Cemit)
2. Lumi i Zanaqishtit
3. Përroi i Hijes
4. Fusha e Rrosë

Photographs: L. Shuka

P. hirtiflora aggregate in Albania: Variation of corolla shape

Top row:
P. hirtiflora var. louisii (corolla lobes not or only slightly emarginate)

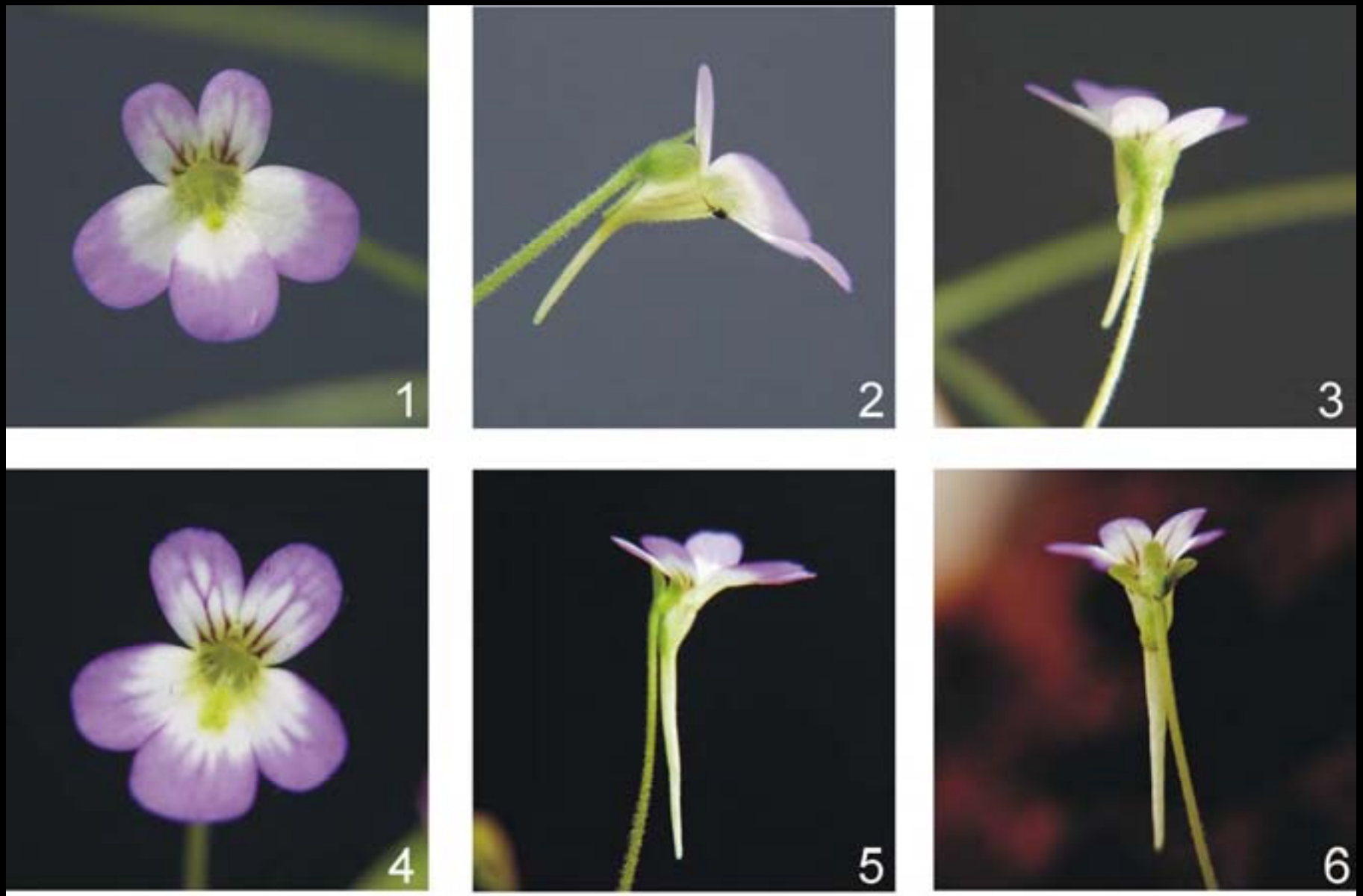
Remaining rows:
P. hirtiflora from 10 sites in Albania (corolla lobes mostly emarginate)

Photographs: L. Shuka

P. hirtiflora var. louisii

(corolla lobes not emarginate, often long spurs)

Photographs:
Rosemarie Stimper



Greece:

In 1974 J. Contanriopoulos & P. Quezel found a ploidy row and distinguished

- *P. hirtiflora* (2n=16)
- *P. hirtiflora var. louisii* (2n=24)
- *P. hirtiflora var. gionae* (2n=32)
- *P. hirtiflora var. megaspilaea* (2n=48)

Greece:

In1981 A. Strid and N. Franzen reported 2n=27 for *P. hirtiflora* from the Mt. Olympus.

In 1997 T. Mikeladse & J.S. Casper counted 2n=28 for *P. hirtiflora* from Italy and *P. crystallina* from Cyprus.

(In 2004 L.Peruzzi, N.G. Passalacqua and G. Cesca reported 2n=27 for *P. hirtiflora* from Rossano in Italy).

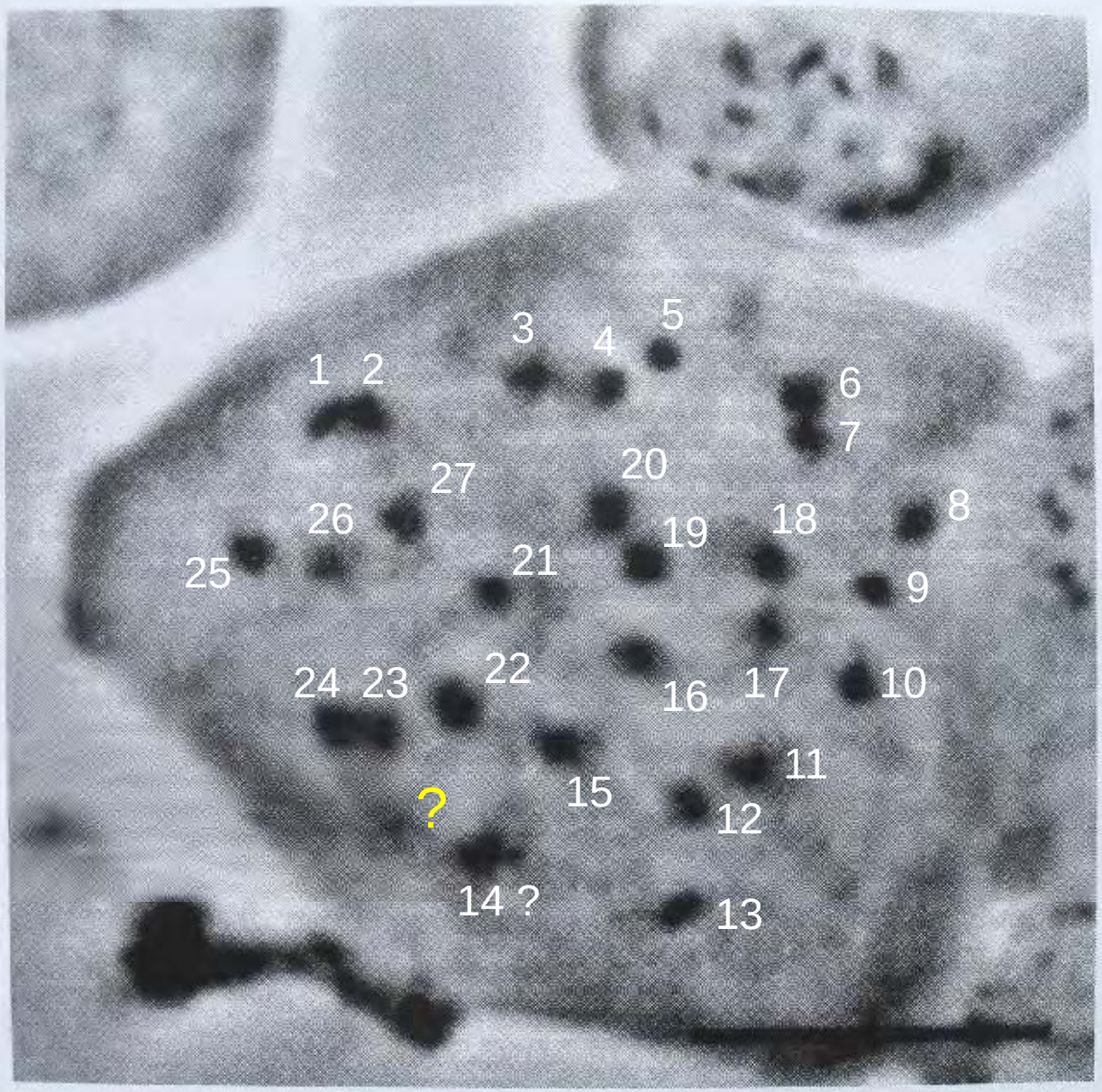


Figure 2. Metaphasic plate in root tip of *P. crystallina* subsp. *hirtiflora* from Rossano (Calabria, Southern Italy) showing 2n = 27 chromosomes. Scale bar = 5µm

P. hirtiflora var. hirtiflora
Italy, Calabria, Rossano, with 2n = 27 as reported by L Peruzzi, NG Passalacqua and D Cesca in 2004.

2n= 27 was also reported in 1981 by A Strid & N. Franzen for material from Mt. Olympus in Greece

It is likely that the real number is 2n=28 (nr. 28 at ? or partly covered by nr. 14, figures by J Steiger)

Perception psychology

„I would not have believed it
if I had not seen it.“

Perception psychology

„I would not have seen it
if I had not believed it.“

Perception psychology

We believe what we see

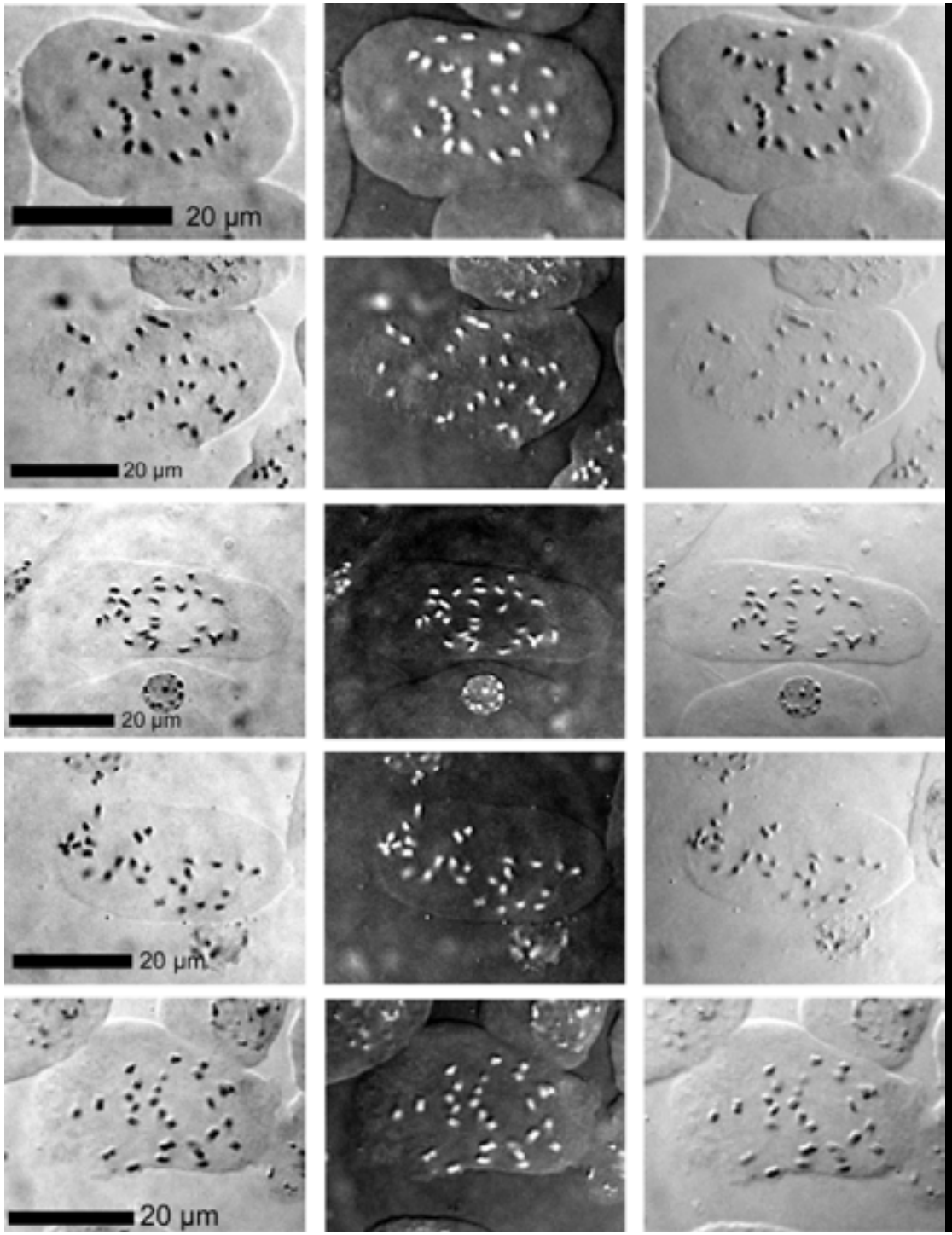
We see what we believe

In 2007 S.J. Casper & R. Stimper counted numerous samples and found the following numbers:

- *P. crystallina subsp. crystallina* 2n=28 (Cyprus: Ayios Nikolaos).
- *P. hirtiflora var. hirtiflora* 2n=28 (Italy: Acqua Santa, Rossano. Albania: Togëz, Librazhd, Floq, Këlcyre, Shkalla e Rrapsës, Lumi i Cenit. Greece: Smolikas, Olympos)
- *P. hirtiflora var. louisii* n=14, 2n=28, 2n=56 (Albania: Linza and Dajti near Tirana)
- *P. hirtiflora var. gionae* 2n=56 (Greece: Reka Gorge)
- *P. hirtiflora var. megaspilaea* 2n=56 (Greece: Styx spring)

The 2n=16, 24, 32, 48 and 27 counts were obviously wrong.


Chromosome numbers of the P. hirtiflora-crystallina aggregate
?
28
28
56
?
28
28
56
56
?
?
28



Chromosomes of

Pinguicula hirtiflora var. hirtiflora

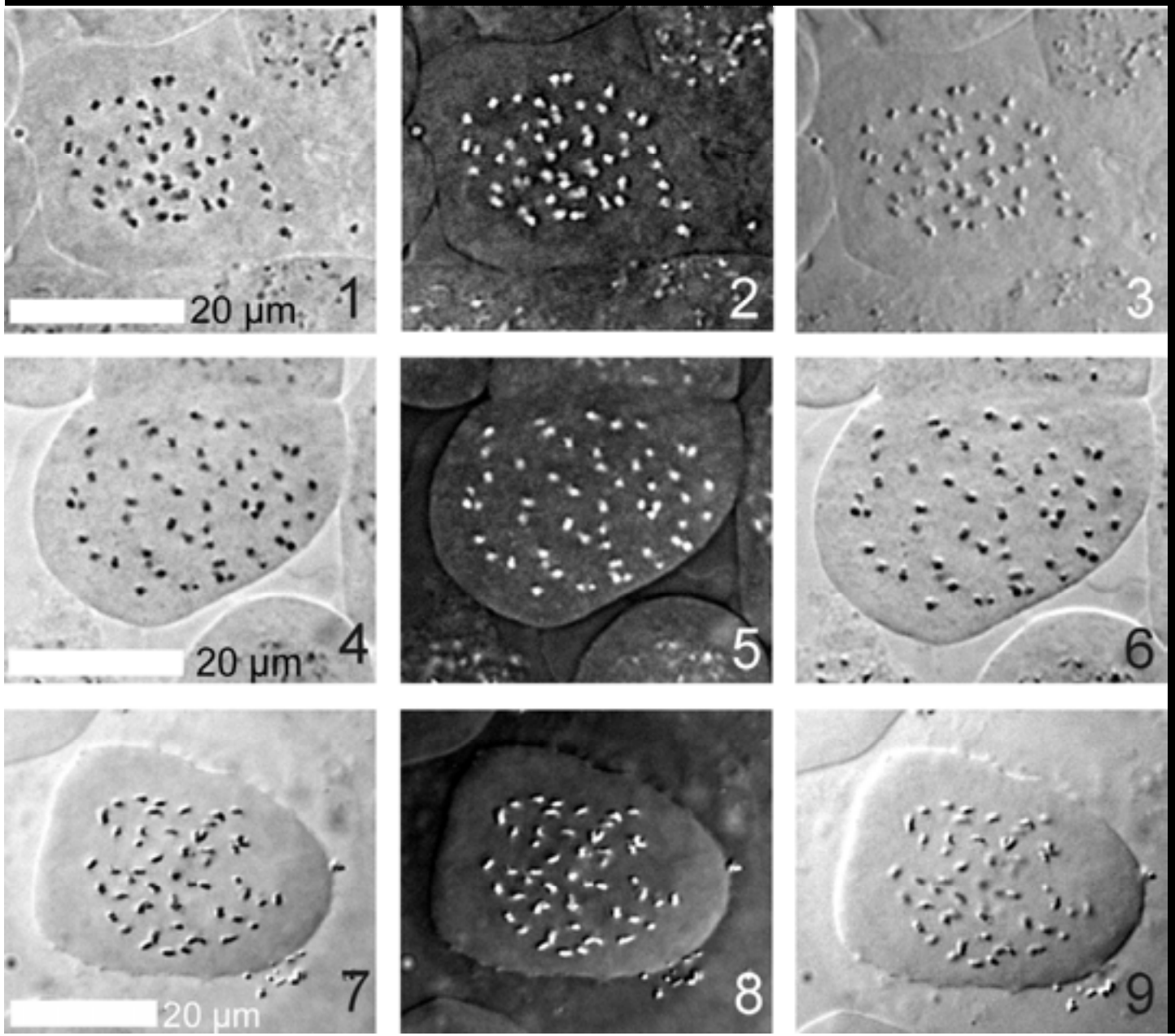
from Albania, Këlcyre

5 somatic metaphase plate from root tips (black-white, white-black, differential interference contrast)

2n = 28

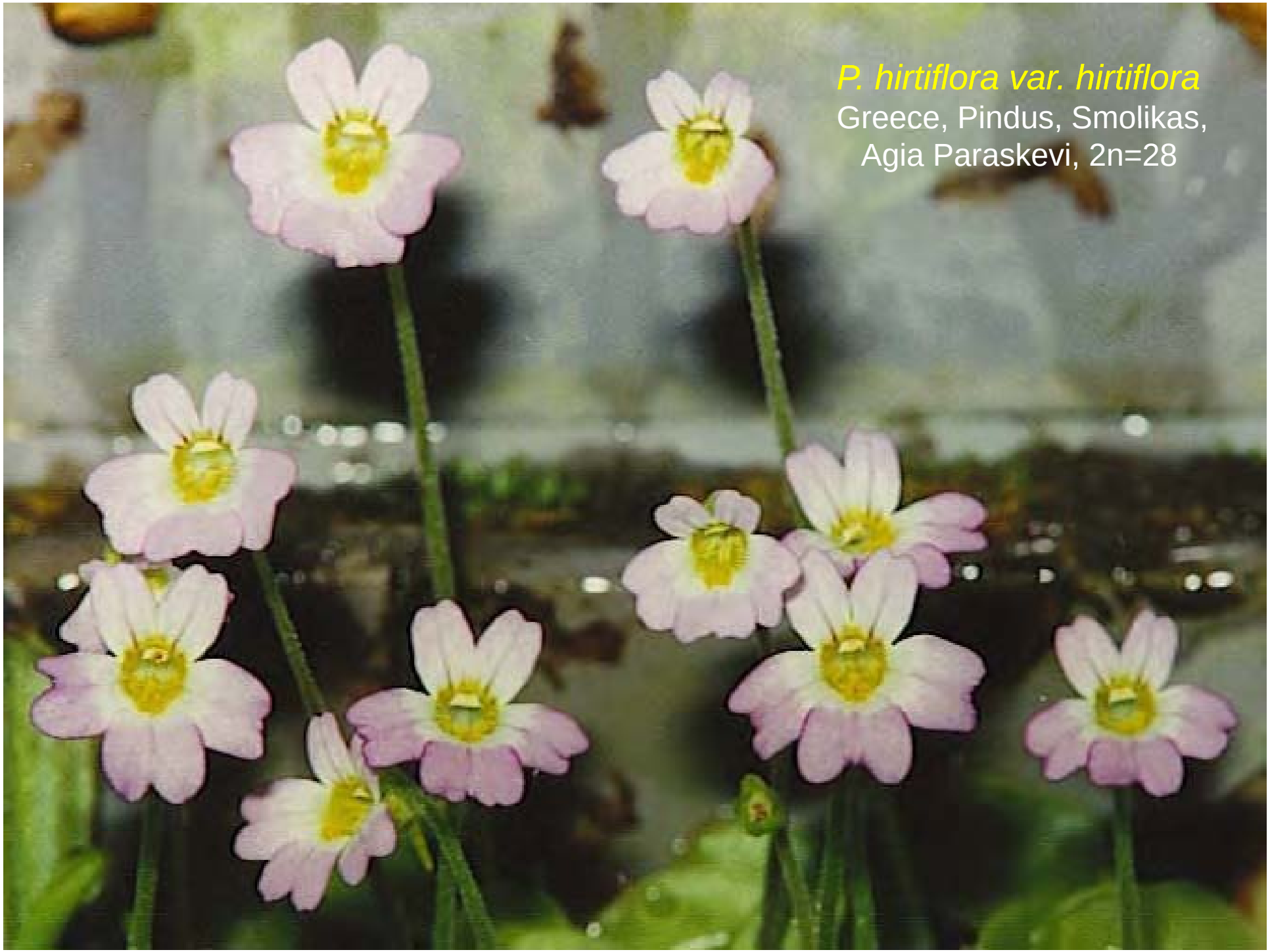
Preparation and microphotographs:
Rosemarie Stimper

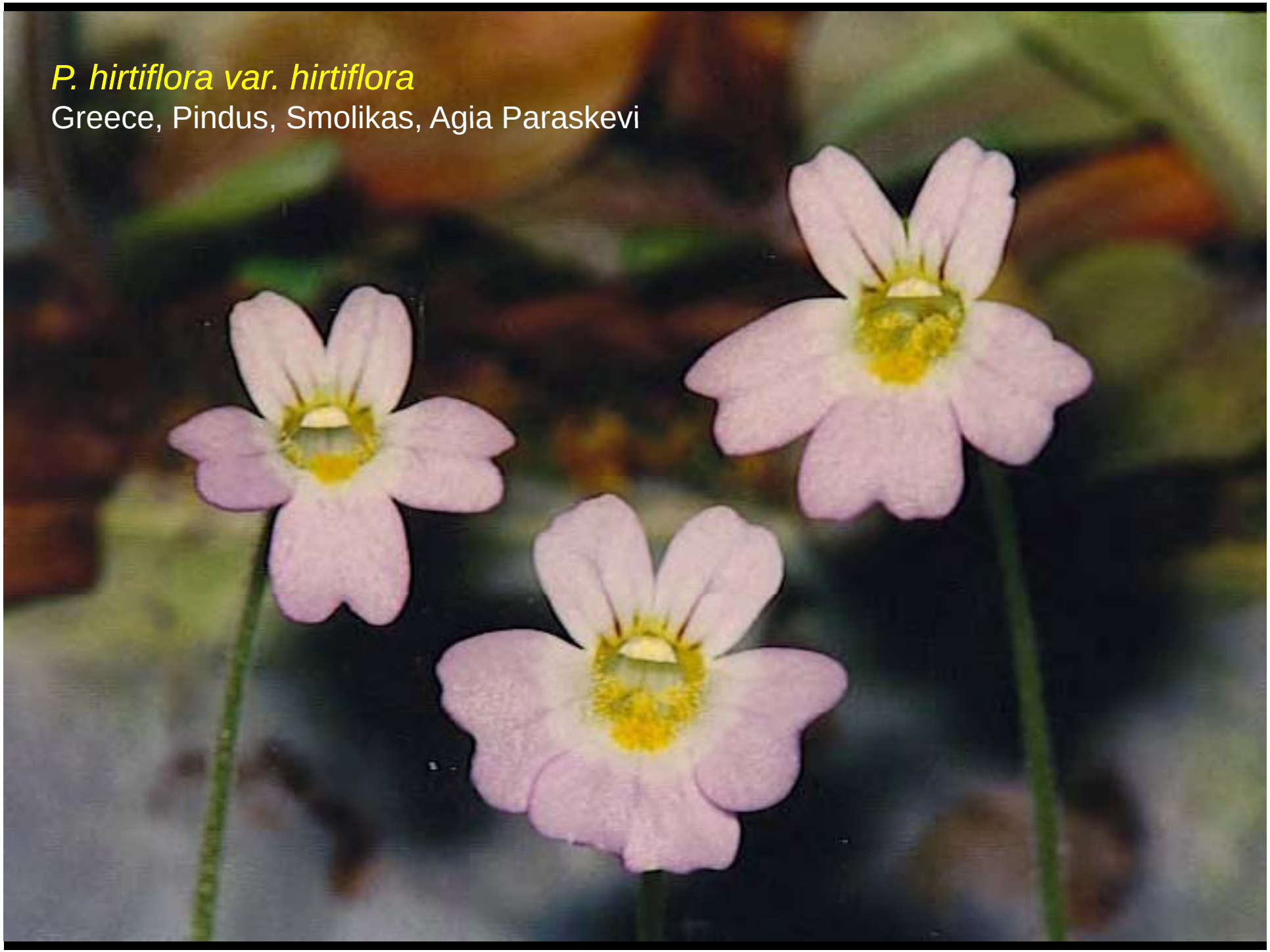
Chromosomes of *P. hirtiflora var. louisii* *2n = 56.* 3 somatic metaphase plates (root tips)



Preparation and microphotographs: Rosemarie Stimper

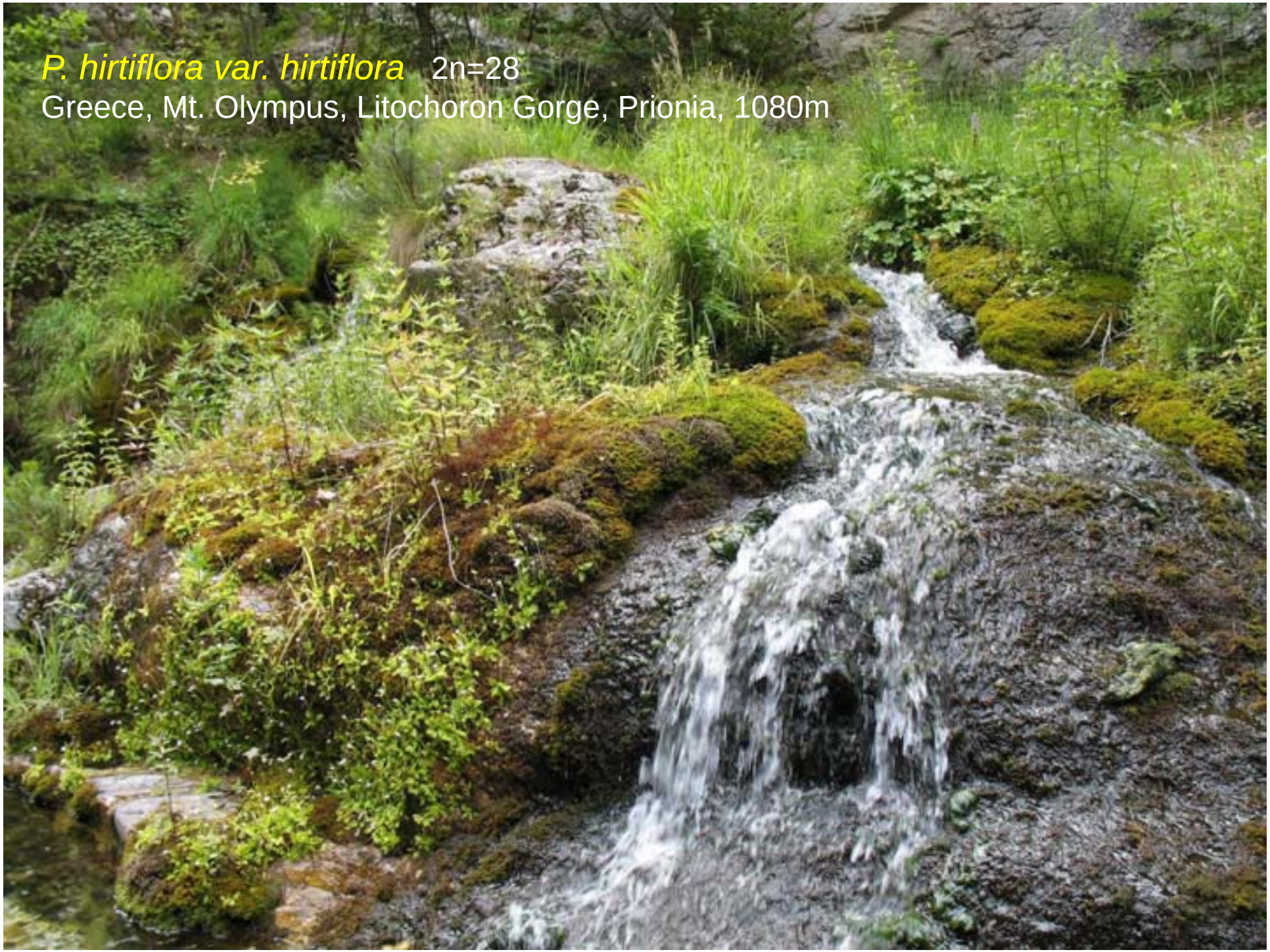
Winter stage of *P. hirtiflora*


P. hirtiflora var. hirtiflora
Greece, Pindus, Smolikas,
Agia Paraskevi, 2n=28


P. hirtiflora var. hirtiflora
Greece, Pindus, Smolikas, Agia Paraskevi

P. hirtiflora var. hirtiflora, Greece, Pindus, Smolikas, Eptahori, on serpentine, in cult.
Fresh leaves tinted reddish, older leaves green

P. hirtiflora var. megaspilaea. Fresh leaves green, older leaves tinted reddish


P. hirtiflora var. hirtiflora 2n=28
Greece, Mt. Olympus, Litochoron Gorge, Prionia, 1080m

P. hirtiflora var. hirtiflora
2n=28

Greece, Mt. Olympus, Prionia, Litochoron Gorge

P. hirtiflora var. hirtiflora 2n=28 Greece, Mt. Olympus, Litochoron Gorge, cult.

P. hirtiflora var. hirtiflora
Greece, Vardoussia, Athanassios Diakos, 1500m
The site is certainly covered by snow at times in winter

At this small site white flowe-ring specimens are not rare.

P. hirtiflora var. hirtiflora
Greece, Vardoussia,
Athanassios Diakos,
1500m, in cult.

Lower corolla lobes con-
spicuously emarginate

P. hirtiflora var. hirtiflora
Greece, Vardoussia, Athanassios Diakos

At this site with *Sphagum* moss *P. hirtiflora* grows like *P. villosa*: Each year the rosette develops from one floor higher up

P. hirtiflora flower with 4 spurs


Reka Gorge
Mt. Giona 2507m

Reka Gorge (below Mt. Gionae), site of *P. hirtiflora var. gionae*, limestone, 1350m


P. hirtiflora var. gionae **2n=56**
Greece, Mt. Gionae, Reka Gorge, 1350m
Note the color variability of the leaves


P. hirtiflora var. gionae *2n=56*

P. hirtiflora var. gionae

Note the wide angle between upper and lower corolla lip


Greece, Mt. Parnassos from E side
Dhipotama Gorge
Entrance to the Dhipotama Gorge


Greece, Mt. Parnassos E side,
Dhipotama Gorge, limestone,
650m, site of *P. hirtiflora var. ?*


P. hirtiflora var. ?
Greece, Mt. Parnassos,
Dhipotama Gorge

P. hirtiflora var. ?
Greece, Mt. Parnassos,
Dhipotama Gorge

Greece, Peloponnes, Mt. Chelmos, Styx/Mavroneri Spring, limestone, 1930m, highest known site of *P. hirtiflora*


Ping. hirtiflora var. megaspilaea 2n=56
Greece, Peloponnes, Mt. Chelmos,
Styx/Mavroneri Spring, limestone, 1930m,
highest known site of *P. hirtiflora*

Ping. hirtiflora var. megaspilaea 2n=56


Ping. hirtiflora var. megaspilaea 2n=56
Greece, Peloponnes, Mt. Chelmos,
Styx/Mavroneri Spring, limestone, 1930m


Ping. hirtiflora var. megaspilaea 2n=56

Greece, Peloponnes, Mt. Chelmos, Styx/Mavroneri Spring, limestone


Greece, Peloponnes, Mt. Chelmos, Styx/Mavroneri Spring,
Jan Schlauer approaching one of the *P. hirtiflora var. megaspilaea* sites

Ping. hirtiflora var. megaspilaea, note the tendency to narrow long leaves

Ping. hirtiflora var. megaspilaea, note the rounded, not emarginate corolla lobes

Ping. hirtiflora var. megaspilaea


Ping. hirtiflora var. megaspilaea


Ping. hirtiflora var. megaspilaea

Ping. hirtiflora var. ?

SW Turkey, Salda Gölü, 1250m, site covered by snow each winter

P. hirtiflora var. ? from Turkey, Nur Daglari

P. hirtiflora from Nur Daglari vs. *P. crystallina*

P. hirtiflora (Nur Daglari)

P. hirtiflora (Nur Daglari)
Photograph: Hiro Shimai

P. crystallina (Ayios Nikolaos)

P. hirtiflora var. hirtiflora (Smolikas)

P. hirtiflora var. megaspilaea (Megaspilaeon)

P. hirtiflora var. gionae (Reka Gorge)

P. hirtifl. var. hirtiflora Albino (Vardoussia)

P. hirtiflora var. hirtiflora (Smolikas)

P. hirtiflora var. megaspilaea (Megaspilaeon)

P. hirtiflora var. gionae (Reka Gorge)

P. hirtifl. var. hirtiflora Albino (Vardoussia)

True scale of flower size

P. hirtiflora var. hirtiflora (Vietri)

P. hirtiflora var. hirtiflora (Smolikas)

P. crystallina (Ayios Nikolaos)

P. crystallina (Caledonian Fall)


Chromosome numbers of the P. hirtiflora-crystallina aggregate
?
28
28
56
?
28
28
56
56
?
?
28

Some corolla shapes of the *P. hirtiflora* aggregate

Upper row: Italy Vietri, Italy Rossano, Albania Librazhd, Greece Smolikas, Greece Olympus
Lower row: Greece Megaspilaeon, Greece Vardoussia, Turkey Salda Gölü, Turkey Nur Daglari, Cyprus Ayios Nikol.


Thank you!