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Authors: Gottschlich, Günter, Drenckhahn, Detlev, and Meierott, Lenz

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GÜNTER GOTTSCHLICH, DETLEV DRENCKHAHN & LENZ MEIEROTT

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Abstract

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Hieracium greuteri, only known from the northern Peloponnese, is described as a species new to science and illustrated. Scanning electron microscopical analysis of the surface structures of leaves and involucre bracts indicates a relationship to the *H. olympicum* group.

Key words: *Asteraceae*, hawkweeds, taxonomy, scanning electron microscopy, leaf surface micromorphology.

Greece is well known for the high diversity of its phanerogam flora, which is also reflected by the species richness in the genus *Hieracium*. Apart from a basic stock of species with wide European distribution, the Greek *Hieracium* flora includes more than twenty endemic collective species and one endemic section (*H. sect. Bracteolata*). Depending on the species concept, a number of infraspecific taxa or microspecies must be added. Extensive recent collections and modern taxonomic investigations on Greek *Hieracia* are lacking. The current knowledge of the Greek endemics is still based mainly on the classic collections of Spruner, Orphanides, Heldreich, Sintenis, Frivaldszky, Rechinger and others. The only excursion with main focus on the genus *Hieracium* was undertaken by the Saxonian botanists Otto and Ernst Behr (Germany) in 1938. Although this excursion was restricted to Mts Olympus, Pindus and Athos, and although it was undertaken too early in the season, it led to the description of seven new taxa (Behr & al. 1939).

Recently, the first author received several Greek herbarium specimens of *Hieracium* for revision, which have proven that additional, undescribed taxa are present. Unfortunately, some of the collections contain only single individuals the identity of which needs verification by new, more representative collections. Therefore at present only one new species can be described.

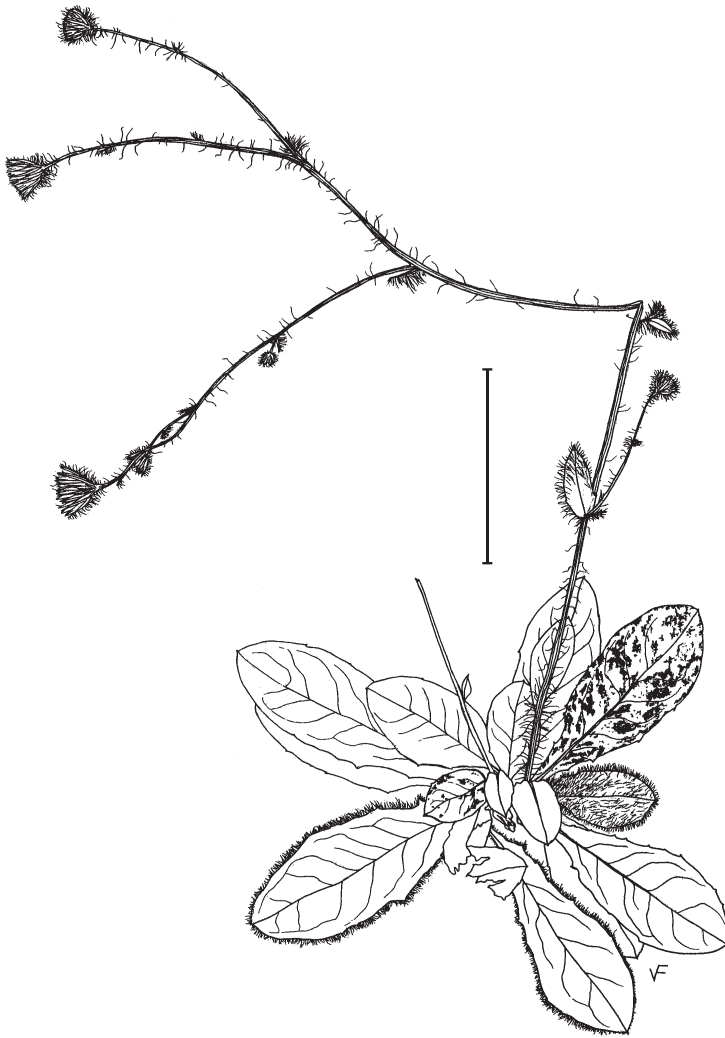


Fig. 1. *Hieracium greuteri*. – Scale bar = 5 cm; spots and indumentum of the basal leaves exemplarily shown; drawn after the holotype by Felicitas Velten.

***Hieracium greuteri* Gottschl., sp. nov.**

Holotypus: Greece, Peloponnisos, Nom. Achaia, Chelmos, 2.5 km SW Solos, oberes Flusstal des Krathis-Potamos, Aufstieg zur Styx-Schlucht, 1200-1500 m, 29.6.2002, L. Meierott 02GR319 (B; isotypi: UPA, herb. Gottschlich No. 45139) – Fig. 1.

Caulis (35-)45-55(-65) cm altus, phyllopodus, pilis simplicibus modice densis, albis, ad basin luteis, plus minusve rigidis, 4-7 mm longis, breviter dentatis, pilis stellatis modice densis vel sparsis, pilis glanduliferis solitariis; *folia* rosularia 5-8, sessilia, laminae ellipticae ad obovatae, 5-7 × 2-3 cm, subacutae, sursum submaculatae vel immaculatae, utrimque subglaucae, dense ceratae, cera trabeculosa, sparsim microglandulosae, subdense pilosae, pilis simplicibus, albis, ad basin luteis, mollibus, 2-3 mm longis, denticulatis, in dimidio distale denticulis 1-2 plurius longioribus quam diametro pilorum, pilis stellatis nullis; folia caulina 3-5, inferiora mediaeque

elliptica, 1.5-3 × 0.3-1.5 cm, acuta, superiora bracteoliformia, indumento ut in foliis rosulariis; *synflorescentia* laxa paniculata, ramis 3-5, 10-20 cm longis, 1-2(-4)-cephalis (capitulis reliquis abortis), capitulis (5-)7-10(-12), aclado 4-8 cm longo; *pedunculi* cum 1-3 bracteolis, sparsim ad modice pilosi, pilis albis, ad basin atris, plus minusve rigidis, 4-7 mm longis, breviter denticulatis, pilis stellatis modice densis, pilis glanduliferis solitariis; *involucra* 9-11 mm longa; *involucra phylla* usque ad 1 mm lata, acuta, griseo-viridia, marginibus late pallido-viridibus, sparsim ad modice pilosa, pilis simplicibus ut in pedunculis, pilis stellatis modice densis, pilis glanduliferis solitariis, papillis epidermalibus densis ceraceisque, cera trabeculosa partim filiformis; *ligulae* luteae ciliis nullis, stylis luteis nigropapillatis; *achaenia* ligno-brunnea. Floret mensibus Julio et Augusto.

Eponymy. – We dedicate this new species to Prof. Dr Werner Greuter in respect for his great merits in systematic botany.

Relationship. – Because of the overall phenotype, the rigid simple hairs on stem and capitula, and the moderate coverage with stellate hairs on the involucre bracts (Fig. 2a), *Hieracium greuteri* shows macroscopic similarities to *H. olympicum* (Fig. 3a). Further support for this relationship was obtained by an analysis of surface structures using scanning electron microscopy (for methods see Drenckhahn 2004). Especially the 100 µm long glandular hairs at the margins and on both sides of the leaves are of great taxonomic value (Fig. 2b, 3b). Such small glandular hairs with often poorly developed swellings of gland cells at the tips (“microglandulae”, “Mikrodrüsen” in the sense of Zahn, 1921-23, 1922-38) are uncommon in *H.* subg. *Hieracium*. The surface of the involucre bracts of both species is studded with epidermal papillae (Fig. 2c, 3c). Density, shape and size of the involucre papillae display considerable variation between species throughout the genus and thus are of potential taxonomic value (Beaman 1991, Buttler 1991, Drenckhahn 2004, Drenckhahn & Gottschlich in prep.). A further surface structure, not yet applied in the taxonomy of *Hieracium*, is the shape and pattern of epidermal wax crystalloids (Barthlott & al. 1998). Both leaves and involucre bracts of *H. greuteri* and *H. olympicum* are covered with rod-shaped (rodlets, trabeculae) and granular wax crystalloids (Fig. 2c, h, i; 3c, h, i). At the surface of the papillae the wax crystalloids frequently form short, thread-like (filiform) structures extending beyond the surface (Fig. 2c).

Beside these similarities, *Hieracium greuteri* differs from *H. olympicum* by the hairy upper side of the basal leaves and the ultrastructure of the simple hairs with longer teeth (denticuli) and often rather deeply forked tips (furculae) (Fig. 2 f, g). In contrast to the hairs on the leaves, the simple hairs of stem and involucre bracts have a similar structure in both species, with short denticuli and shortly forked or simple tips. The structural features of the hairs on the basal leaves (Fig. 2f) may result from hybridisation with and introgression by a species of *H.* sect. *Pannosa* (*H. parnassi?*), which would also explain the shape of the leaves of *H. greuteri*.

Notes on the taxonomy of Hieracium olympicum. – *Hieracium olympicum* was interpreted by Zahn (1921-23) as an intermediate species between *H. heterogynum* and *H. racemosum* (“*heterogynum* < *racemosum*”). This classification was mainly based on the rigid, long, simple hairs at the margins of the basal leaves. However, the distribution areas of both species do not overlap. *H. heterogynum* (= *H. stuposum*) extends from S Istria to N Albania, mainly across the coastal mountains. Eastwards it extends through W Serbia to NW Bulgaria. Especially in the coastal regions of Croatia and in Montenegro, hybridisation of *H. heterogynum* with *H. murorum*, *H. bifidum* and *H. racemosum* resulted in the reticulate evolution of a group of species often difficult to tell apart. Obviously, the central W Balkan Peninsula is a (recent?) centre of development of *H.* sect. *Glauciformia*. In the region of Albania and Bulgaria, hybridisation with species of *H.* sect. *Pannosa* may have occurred. Some of the putatively hybridogenous species have expanded beyond the area of *H. heterogynum* in southern direction (*H. nipholasium*: Pirin Mts; *H. peristericum*: NE Greece); even a trans-Adriatic disjunction is known (*H. portanum*: Mte Pollino, Calabria).

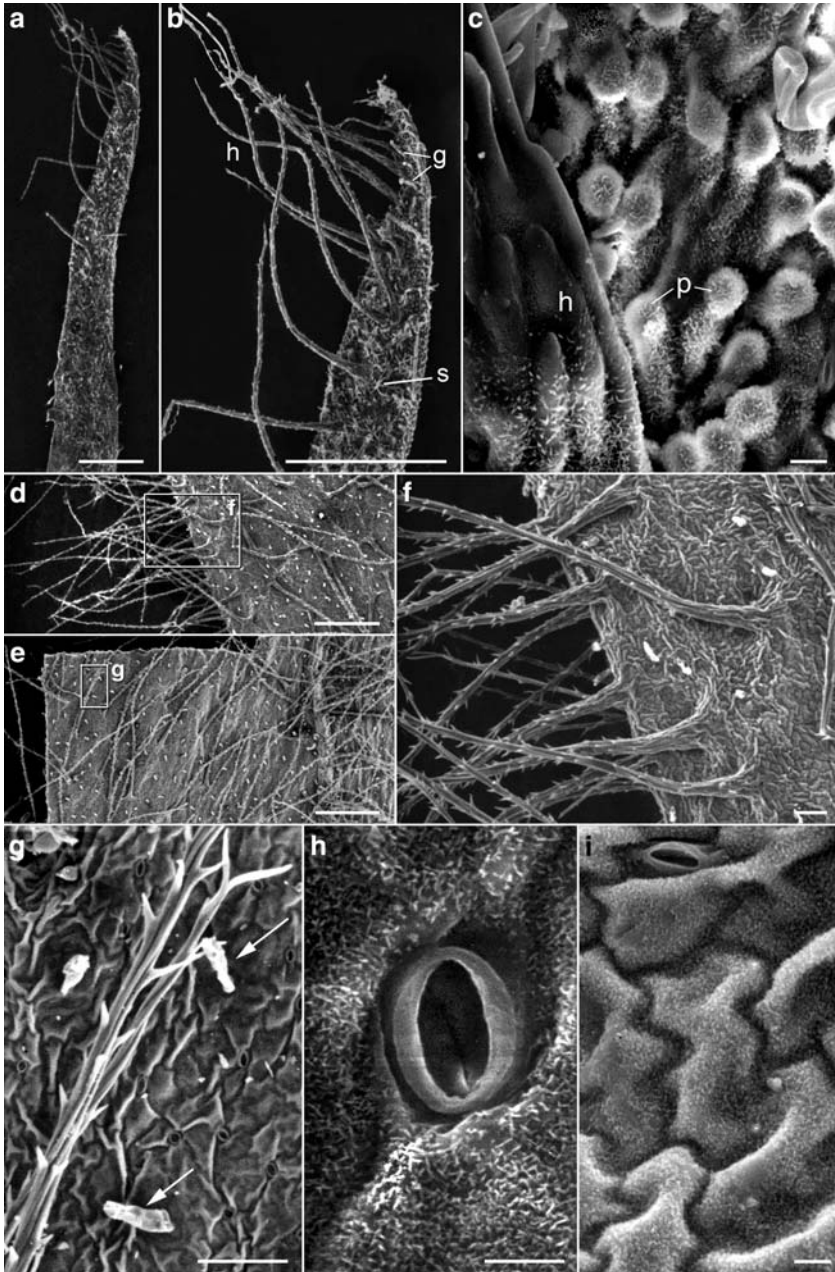


Fig. 2. *Hieracium greuteri*, scanning electron micrographs of involucre bracts (a-c) and basal leaves (d-i) – a-b: low magnification of involucre bracts with several simple hairs (= h) and scattered stellate hairs (= s) as well as gland hairs (= g); c: higher magnification of involucre bracts to show epidermal papillae (= p) covered with rod-shaped wax crystalloids extending onto the base of simple hairs (= h); d-i: basal leaf with numerous microglands (arrows) and simple hairs on upper side (d, f, i), lower side (e, g, h) and at margins (d, f); note dense coverage of epidermis but not of stomata with mostly rod-shaped (rodlets, trabeculae) wax crystalloids on upper and lower side; teeth (denticuli) of deeply forked hairs (g). – Scale bars: a, b, d, e = 1 mm; f, g = 100 μm; c, h, i = 10 μm; from the isotypes.

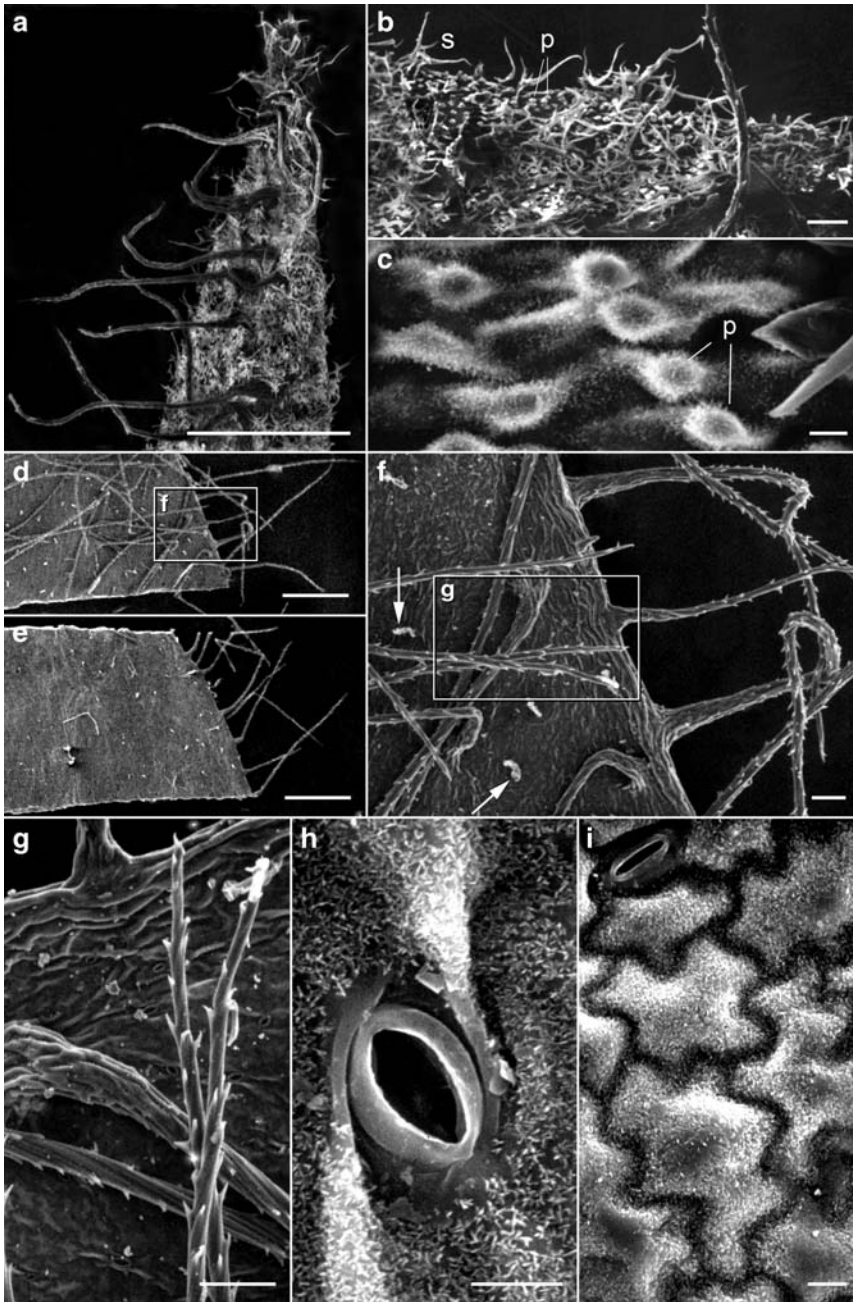


Fig. 3. *Hieracium olympicum*, scanning electron micrographs of involucre bracts (a-c) and basal leaves (d-i) – a-c: low, medium and high magnification of involucre bract surface, densely covered with stellate hairs (= s), short simple hairs and numerous epidermal papillae (= p) covered with rod-shaped and short filiform wax crystalloids; d-i: basal leaves with numerous microglands (arrows) on lower side (d, f, g, h) and upper side (e, i); cover with trabecular wax crystalloids and simple hairs with short teeth (denticuli) (f, g) and shortly forked or simple tips. – Scale bars: a, d, e = 1 mm; b, f, g = 100 μ m; c, h, i = 10 μ m; specimen: Turkey, 30.7.1988, *M. Nydegger 43912* (herb. Gottschlich 9944, Soc. Éch. Pl. Vasc. Eur. Méd. 14620).

The area of *Hieracium olympicum*, however, is clearly separated from that of *H.* sect. *Glauciformia*. In the western part it extends to the Bulgarian and Greek Pirin and Rhodope Mts reaching the northern and southern foothills (Rumelia, E Macedonia, Thracia). Two disjunct subareas are in Turkey (Uludağ near Bursa and Giresun in E Anatolia).

In view of the geographical separation of *Hieracium olympicum* from *H.* sect. *Glauciformia* and the pronounced morphological differences between both taxa, it appears reasonable to assume that *H. olympicum* belongs to an independent species group ("main species", "Hauptart"), probably with its own hybrid species. In the past, *H. olympicum* may have covered a greater distribution area than today. This is indicated by the fact that the supposedly derived species *H. greuteri* (N Peloponnisos) and *H. scamandris* ("*olypticum* < *bracteolatum*") (NW Turkey) are not sympatric with it.

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Addresses of the authors:

Günter Gottschlich, Hermann-Kurz-Str. 35, D-72074 Tübingen, Germany; e-mail: ggtuebingen@yahoo.com

Detlev Drenckhahn, Institut für Anatomie und Zellbiologie, Julius-Maximilians-Universität Würzburg, Koellikerstr. 6, D-97070 Würzburg, Germany; e-mail: detlev.drenckhahn@mail.uni-wuerzburg.de

Lenz Meierott, Am Happach 43, D-97218 Gerbrunn, Germany; e-mail: lenz.jutta.meierott@t-online.de