

Six new *Taraxacum* (sect. *Taraxacum*) species (Asteraceae) from Finland and Sweden

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Six new species of *Taraxacum* sect. *Taraxacum* from Finland are described here based on both field studies and cultivated material. Their morphology is compared with closely related species, and a survey of their known distribution is given. Holotypes are deposited to H. *T. cabannaeforme* have been found at many locations in southern Finland, but the number of plants is usually small. *T. coartatiforme* is locally common in Joensuu, North Karelia; elsewhere it is very rare. *T. osiclivosum* is distributed from eastern Finland to South Savo, being more common in the latter. Although *T. sinus-avis* is evident especially in North Karelia, occurrences in southern Finland and Sweden indicate that the distribution area may be quite extensive. *T. subinvestiens* ja *T. volitans* are known only to exist in Joensuu, North Karelia. Additional studies are required to clarify their total distributions.

Introduction

Although *Taraxacum* sect. *Taraxacum* (Kirschner & Štěpánek 2011) has been studied quite extensively in Finland, many taxa remain to be described. For proper diagnosis, these must be grown and studied at garden for many years in order to evaluate the morphological variation within and between species. All new species described here were cultivated for many years in experimental gardens.

Studying leaves at different ages provides crucial information concerning morphology. For example, juvenile leaves are often broader than mature ones. Juveniles seem to be more common in nature than in experimental gardens. These are not generally used for identification, but after careful observation in garden conditions their identification becomes possible. Recently established lawns are often invaded by many *Taraxacum* species, which have simultaneously both ju-

venile and mature leaves. This may be misleading. For example, I originally considered that *T. sinus-avis* described here consisted of two species, but cultivation revealed the leaves to belong to the same taxon.

Material and methods

Field studies with preliminary field observations were performed in Finland from 1997 to 2010. Plants raised from seeds were cultivated for several years in the Joensuu University Botanical Garden Botania, or in the private garden of the author. The seeds were from holotypes or paratypes.

The term 'pseudotype' is applied here for herbarium material cultivated from types, as suggested by Kirschner & Štěpánek (1997:57) for cultivated apomictic taxa. The term is not commonly accepted.

Pictures of new species described here are available at <http://morphbank.digitarium.fi>.

[<http://morphbank.digitarium.fi/MyManager/?tab=specimenTab>].

New species described here were compared with collections at Botanical Museums at H, OULU and S. Holotypes are deposited to H. Acronyms of the herbaria follow Holmgren et al. (1990). Additionally, JR = private herbarium of Juhani Räsänen, MK of Matti Kääntönen (Finland, Tampere), PO of Piet Oosterveld (Netherlands, Zeist) and HØ of Hans Øllgaard (Denmark, Viborg). Nomenclature is according Lundevall & Øllgaard (1999).

Acronyms to biogeographical provinces of Finland: U(N) = Uusimaa (Nylandia), EK(Ka) = Etelä-Karjala (Karelia australis), St = Satakunta, EH(Ta) = Etelä-Häme (Tavastia australis), ES(Sa) = Etelä-Savo (Savonia australis), PK(Kb) = Pohjois-Karjala (Karelia borealis). WGS 84 and Unified Coordinate System are given (Grid 27°E).

New taxa

Taraxacum cabannaeforme J. Räsänen, sp. nova (Fig. 1)

Holotype: Finland, U(N), Elimäki, Nappa. Road side near Esso service station, on lawn, alt. 63 m, 30.V.2000 Juhani Räsänen U189. Pos. 60°51'29"N 26°34'00"E (Grid 27°E 67498:4766) (H 819961). Isotypes OULU 10002430, C, S.

Etymology: The name refers to cabanna, cottage in English. Terminal lobe is often cottage-shaped.

Planta mediae magnitudinis, 20–40 cm alta, rosula suberecta. *Folia* late lanceolata, obscure viridia parum glaucescentia, supra glabrescentia, exteriora et intermedia omnia lobata, interiora interdum non lobata, ± grosse dentata, maculis dispersis nullis, petiolo non vel angusto alato, obscure vel interdum pallide violaceis, nervo medio sordidescente, striolis coloratis carentibus. *Lobi laterales* utrinque c. 3–5, saepe alterni, deltoidei vel interdum patentes, margine distali parum sinuato, integro vel interdum subulato-denticulato, proximali fere recto, apice acuto. *Lobus terminalis* plerumque parvus vel mediocriter magna, hastato-sagittatus, cabannaeformis vel interdum fissus, apice curto acuto. *Interlobia* rotundata vel

subangulata summa saepe acutangula plana vel parce plicata, integra vel rarius ± dentata, parce piceo-maculata. *Scapi* sub involucro ± araneosi, ceterum glabrescentes. *Involucrum* viride vel obscure viride, pruinose. *Squamae exteriores* lanceolatae, c. 14 × 3–4 mm, canescenti-virides vel paullo rubescentes, regulares, margine angustissime hyalino, curvato-reflexae, apice non corniculato. *Squamae interiores* latitudine inter se fere aequales. *Calathium* c. 35–45 mm diametro, laxum vel mediocriter densum, convexum. *Ligulae* mediocriter luteae, planae, subtus stria rubro-canescens quam ipsius ligulae angustiore ornatae, denticulis apicalibus luteis vel parce rubris. *Antherae* polliniferae. *Stigmata* virescentia. *Achenium* fusco-stramineum, pyramide inclusa 3,6–3,8 mm longum, superne spinulis mediae longitudinis vel longissimis modice robustis saepe parum squamiformibus rectis vel incurvis instructum, pyramide c. 0,6–0,7 mm longa, cylindrica, laevi. *Rostrum* c. 11–12 mm longum. *Pappus* albus.

Taraxacum cabannaeforme is a medium-sized species with a suberect rosette. Leaves dark or faintly bluish green, glabrescent, unspotted. Leaf lobation distinct in outer and middle leaves, but sometimes missing or reduced to gross dentation in inner leaves. Petioles unwinged or narrowly winged, obscure or sometimes pale violet. Midrib green to indistinctly reddish or brownish, not striolate. Lateral leaf lobes recurved or sometimes patent, undivided, with straight to concave almost entire upper margin, and with very acute tip. Proximal lobe margin ± straight, entire. Terminal lobe small to medium-sized, often cottage-shaped, variable acute tip. Interlobes broadly rounded or indistinctly angular, uppermost often acute angled, flat to indistinctly plicate, with faint or missing tar-colour. Scapi ± hairy under the involucre, elsewhere glabrescent. Involucre pale to dark green, pruinose. Outer phyllaries ca. 14 × 3–4 mm, ± dark greyish green, often with an indistinctly reddish hue, rather regularly arranged, ± curved – reflexed, all with flat narrowly hyaline border. Capitulum ca. 35–45 mm in diameter, lax or medium dense, profile ± convex. Ligules flat, medium yellow, with yellow or dark apical ligule teeth. Ligule stripe narrower than ligule, indistinctly reddish grey. Pollen present. Stigmas discoloured. Achenes straw-coloured, 3,6–3,8 mm long (incl. the cone), spinulose in the distal part,



Fig. 1A. Holotype of *Taraxacum cabannaeforme*. B. Achenes.

the spinules medium long or very long, medium strong often squamulose, incurved to straight. Achene cone ca. 0.6–0.7 mm long, cylindrical, usually smooth. Rostrum length 11–12 mm.

Discussion. This species was in cultivation from 2001 to 2008. The closest morphological relative of *T. cabannaeforme* seems to be *T. borgvallii* Dahlst. ex Hagl. (Haglund 1936), a widespread well-known species. However, the petioles of the latter generally have a stronger red colouration, leaves are a brighter green, the upper margin of the lateral leaf lobes are straight to convex and the terminal lobe differs in its tongue-shaped tip.

T. borgvallii has also shorter outer phyllaries, and smaller capitulum and achenes.

As well, *T. obnubilum* Dahlst. ex Puolanne (Puolanne 1933) is sometimes similar in appearance to *T. cabannaeforme*. Generally it is distinctly more robust, the capitulum is 45–60 mm (35–45 mm in *T. cabannaeforme*; Fig. 3) and leaves are broader by up to 70 mm (in *T. cabannaeforme* up to 45 mm). If the terminal lobe is two partial, in *T. obnubilum* it is sharply clefted, and the lobe of *T. cabannaeforme* is often cottage-shaped (Fig. 2). In older leaves the shape is not obvious (Fig. 1). The inner leaves of *T. cabannaeforme*

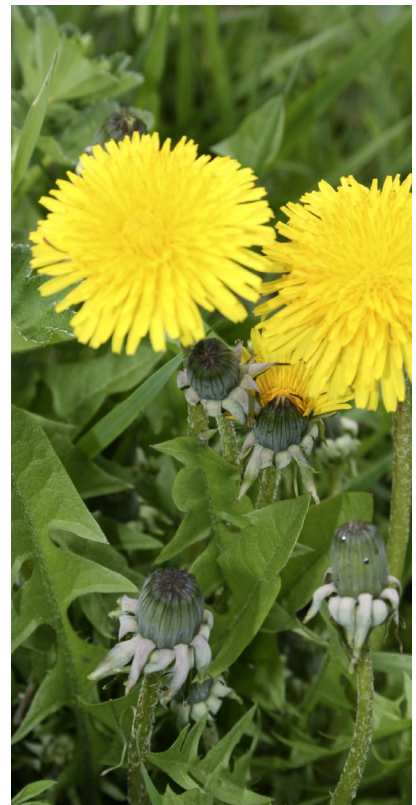


Fig. 3. Capitulum of *Taraxacum cabannaeforme*.

Fig. 2. Pseudotype of *Taraxacum cabannaeforme*. Note yhe characteristic cottage-shaped terminal lobes.

can often occur without lobes, but those of *T. obnubilum* are almost always dissected.

Distribution area: Southern Finland

Pseudotypes cultivated of holotype seeds. **Finland.** PK(Kb): Joensuu, Linnunlahti, Botania experimental garden, 1.VI.2003, J. Räsänen 3/148 [H 819960 (Fig. 2), JR, HØ]; 10.VI.2004 J. Räsänen 4/173 (H 819959, JR, HØ); 1.VI.2008 J. Räsänen 8/216 (OULU 10002431, JR).

Paratypes. **Finland.** U(N): Anjalankoski, Anjala, Ummeljoki, Alapää, Ojalanranta 33, on lawn in the garden, alt. 35 m. 26.V.2007 J. Räsänen 7/202. Pos. 60°44'33"N 26°47'06"E (Grid 27°E: 67369:4884), (H 819958, S, JR); U(N): Borgå lk, Kardrag, Lökkudden, 8.VI.1980 C. E. Sonck (H 717105), det. E. Reinikka as *T. stereodes* Ekm.

ex Hagl.; EK(Ka): Anjalankoski, Sippola, Inkeroinen, Sipunmäki, Asematie, road verge near railway station, alt. 30 m, 28.V.2007 J. Räsänen 7/237. Pos. 60°41'40"N 26°50'31"E (Grid 27°E: 67316:4915), (H 817567, JR); St: Hämeenkyrö, Pinsiönkangas, harjukuopassa osin mulatulla töyrämällä [a sand pit at esker with some organic matter]. 3.VI.2010 M. Kääntönen 56/10. YKJ 6834:3310 (H 817568, MK); EH(Ta): Pälkäne, Kukkola, Peltolantie, Penttilä, fallow field 150 m north-west from house, alt. 105 m. 25.5.2012 J. Räsänen 12/65 & Y. Ranta. Pos. 61°20'41"N 24°26'09"E (Grid 27°E: 68067:3629), (H 827563, JR); EH(Ta): Tampere, Vuohenoja, by the crossing of Hervanta main road and Vuohensillankatu, on lawn, alt. 80 m. 30.V.2004 J. Räsänen 4/38 & M. Kääntönen. Pos. 61°29'02"N 23°49'38"E (Grid 27°E: 68236:3311) (H 819937, JR).

Taraxacum coartatiforme J. Räsänen, sp. nova
(Fig. 4)

Holotype: Finland, PK(Kb), Joensuu, Linnunlahti, Pajutie 1 B 4, on lawn in the S-gable of the house, alt. 80 m. 1.VI.2000 Juhani Räsänen U198. Pos. 62°36'10"N 29°43'36"E (Grid 27°E 69472:6401) (H 817562). Isotypes OULU 10002432, HØ.

Etymology: This species is related to *T. coartatum*.

Planta mediae magnitudinis, 20–40 cm alta, rosula suberecta. *Folia* laete vel mediocriter viridia, glabrescentia, omnia lobata, petiolo ± alato, pallide subrubro, folia exteriora interdum viridia, nervo medio viridi vel inferne parce rubescente. *Lobi laterales* utrinque ca. 3–5, deltoidei, mar-

gine distali plerumque convexo integro vel subulato-denticulato, proximali recto vel concavo, apice acuto. *Lobus terminalis* fere mediocriter magna, hastatus vel triangulus vel interdum ipse quadrangulus, apice curto, obtuse-acuto vel saepe longe protracto. *Interlobia* angulata vel rotundata, parce plicata, ± dentata, viridia vel parce piceo-maculata. *Scapi* fere glabrescentes. *Involucrum* pallide vel obscure viride, parce pruinatum. *Squamae exteriores* ca. 16–18 × 3–5 mm, canescenti-virides vel paullo rubescentes, ± irregulares, patentes – sat reflexae, margine valde reflexae angustissime hyalino, apice non vel interdum corniculato. *Squamae interiores* latitudine inter se fere aequales, apice non vel interdum corniculato. *Calathium* ca. 50–60 mm diametro, laxum, planum. *Ligulae* mediocriter luteae, planae, marginales subtus stria canoviolacea angustiore ornatae, denticulis apicalibus luteis vel parce rubris. *Antherae* polliniferae. *Stigmata* virescentia. *Achenium* fusco-stramineum, pyramide inclusa 3,3–3,8 mm longum, superne spinulis brevibus – mediocriter longis modice robustis rectis instructum, pyramide ca. 0,2–0,4 mm longa conica-cylindrica laevi. *Rostrum* 12–13 mm longum.

Taraxacum coartatiforme is a medium-sized species with a suberect rosette. Leaves are pale or mid-green, glabrescent. Petioles ± winged, pinkish sometimes on outer petioles greenish. Midribs green or lower part brownish.



Fig. 4A. Holotype of *Taraxacum coartatiforme*. B. Achenes.



Lateral leaf lobes are recurved (shaped deltoid), undivided, mostly with convex, entire or finely toothed distal margin, lobe apices acute. Proximal lobe margin are straight or concave. Terminal lobe is usually medium-sized, \pm triangular or sometimes even rhombic, obtuse to acute, without distinct tip or it is often gradually elongate or linguulate. Interlobes are angular or broadly rounded, indistinctly plicate, \pm dentate, tar-colouration absent or present. Scapes are rather glabrescent. Involucre light to dark green, indistinctly pruinose. Outer phyllaries are ca. 16–18 long, 3–5 mm wide, grayish green or slightly reddish,

\pm irregular, outwards – strongly reflexed, margin is strongly reflexed to narrowly hyaline border, the tips are sometimes with corniculations. Inner phyllaries are almost equally wide, the tips sometimes with corniculations. Capitulum is ca. 50–60 mm in diameter, medium yellow, lax and with a flat profile. Ligules are flat or canaliculate, with yellow or slightly reddish apical ligule teeth. Ligule stripe is narrower than ligule, indistinctly reddish grey. Produces pollen. Stigmas discoloured. Achenium is grayish brown, 3,3–3,8 mm long (inc. cone). Achene cone ca. 0,2–0,4 mm long, conical or cylindrical, smooth. Achene spinules are short or medium long, medium strong, straight. Rostrum length is 12–13 mm.

Fig. 5. Pseudotype of *Taraxacum coartatiforme*.



Discussion. *Taraxacum coartatiforme* is morphologically most similar to *T. coartatum* Hagl. (Haglund 1942), a widespread species. Both have very similar petioles and capitulum. However, *T. coartatum* is more robust, its leaves are wider and there are lateral leaf lobes more densely located. Terminal lobes of *T. coartatum* are bigger, more regular and obtuse, quite different. Side of the terminal lobe of *T. coartatum* is usually convex and in *T. coartatiforme* concave (terminal lobe *T. coartatum* is thus 'cheeks expanded' and *T. coartatiforme* 'cheeks dented'). Most leaves tips of *T. coartatiforme* are gradually elongated or they are linguulate, a rare feature in *T. coartatum*.

T. coartatiforme may resemble *T. hepaticum* Railons. (Railonsala 1957), but leaves of *T. coartatiforme* are brighter green, lateral leaf lobes are sparser and tar-colouration of interlobes is less intensive. In *T. hepaticum* outer phyllaries are shorter and broader and they are without strongly recurved margin and corniculations.

This species was in cultivation from 1998 to 2009. Especially young plants may resemble *T. coartatum*. However, those can be identified based on their outer leaves. Lateral outer leaf lobes in the juvenile *T. coartatiforme* form often line of rhombs. *T. coartatum* seem to lack this property.

Distribution area: Southern and Eastern Finland.

Pseudotypes cultivated of holotype seeds. **Finland.** PK(Kb): Joensuu, Linnunlahti, Botania, experimental garden, cultivated from holotype, 10.VI.2005 J. Räsänen 5/177 [H 817563 (Fig. 5), OULU, JR].

Paratypes. **Finland.** EH(Ta): Tampere, Teisko, Asuntila, nurmi Purnulammen N-puolella, 27.V.2005 M. Kääntönen 55/05. Grid 27°E: 6845:336 (MK, JR); PK(Kb): Joensuu, Linnunlahti, Pajutie 1 B 4, beside the S-gable of house, on lawn, alt. 80 m, 30.V.1999 J. Räsänen T127. Pos. 62°36'10"N 29°43'36"E (Grid 27°E: 69472:6401) (S, JR); PK(Kb): Joensuu, Linnunlahti, Pajutie 1 C 14, on lawn near fence, alt. 80 m, 20.V.2002 J. Räsänen 2/52. Pos. 62°36'12"N 29°43'34"E (Grid 27°E: 694729:64015) (H 817564, OULU 10002434, S, JR); PK(Kb): Joensuu, Linnunlahti, Pajutie 1 B 4, on the E-side of house, on lawn, alt. 80 m, 6.VI.2007 J. Räsänen 7/339. Pos. 62°36'10"N 29°43'38"E (Grid 27°E: 69472:6402) (JR); PK(Kb): Joensuu, Linnunlahti, Botania experimental garden [cultivated from 2nd generation paratype (J. Räsänen 7/339)], 3.VI.2009 J. Räsänen 9/157 (S, JR); PK(Kb): Joensuu, Linnunlahti, Pajutie 1 B, on lawn, alt. 80 m, 12.VI.2008 J. Räsänen 8/306. Pos. 62°36'10"N 29°43'36"E (YKJ 69472:36401) (H 817565, OULU 10002435, HØ, JR).

***Taraxacum ossiclivosum* J. Räsänen, sp. nova**
(Fig. 6)

Holotype: Finland, ES(Sa), Luumäki, Motelli, roadside of the main road 6, on lawn, alt. 84 m. 22.V.2001 Juhan Räsänen 1/54. Pos. 60°57'36"N 27°48'20"E (Grid 27°E 67614:5438) (H 819956).

Etymology: The locality Luumäki is in English "Bonehill" and in latin "Ossiclivus"

Planta mediae magnitudinis, 30–40 cm alta, rosula suberecta. *Folia* late lanceolata, clara viridia, supra parce vel praesertim in foliis interioribus subaraneosa vel araneosa, omnia lobata, maculis dispersis nullis, petiolo non vel anguste alato, purpureo, nervo medio viridi vel inferne parce rubescente, striolis coloratis carentibus. *Lobi laterales* utrinque ca. 5–6, interdum alterni, patentes vel recurvi saepe profunde fissi, in foliis exterioribus saepe ± deltoidei, margine distali convexo vel sinuato integro vel saepe dentibus longis rubustis ornato, margine proximali integro vel dente conspicuo munito, apice subacuto vel subobtusum. *Lobus terminalis* mediae magnitudinis, subobtusus, fere incisus interdum tripartitus tum pars medius obtusus. *Interlobia* mediocria vel in partem distalem breviora, integra vel ± dentate (interdum unus dens longus), ± plicata, viridia. *Scapi* sub involucrio ± araneosi, ceterum glabrescentes. *Involucrum* obscurius viride, parce pruinatum, basi rotundata. *Squamae exteriores* lanceolatae, ca. 15 × 3–4 mm, canescenti-viridis, arcuato-reflexae, regulares, margine non hyalino,

apice non corniculato. *Squamae interiores* latitudine inter se fere aequales. *Calathium* ca. 50 mm diametro, mediocriter densum, convexum. *Ligulae* mediocriter luteae, planae vel parum canaliculatae, marginales subtus stria quam ipsius ligula angustiore rubro-canescente ornatae, denticulis apicalibus luteis vel parce rubris. *Antherae* poliniferae. *Stigmata* modice virescentia. *Achenium* fusco-stramineum, pyramide inclusa ca. 3,2–3,5 mm longum, superne spinulis mediae longitudinis modice robustis rectis vel incurvis instructum, pyramide ca. 0,1–0,3 mm longa, conica-cylindrica, laevi vel parce spinulosa. *Rostrum* ca. 10–11 longum. *Pappus* albus.

Taraxacum ossiclivosum is a medium sized plant, 30–40 cm tall with bright green, glabrescent or (in inner leaves) sometimes densely hairy, unspotted leaves. Petioles are narrowly winged, purple. Midrib is green to faintly reddish, not striolate. All leaves are distinctly lobed, lateral leaf lobes are patent or recurved, often with ± deeply clefted, (in outer leaves often ± recurved), and with variable acute tip. Proximal lobe margin are entire or distinctly toothed. Terminal lobe is acute. Interlobes are very variable, broadly rounded to indistinctly angular to acute angled, entire or ± toothed (sometimes one long teeth), ± plicate, green. Scapes are hairy under the involucre, elsewhere glabrescent. Involucres are dark green, indistinctly pruinose. Outer phyllaries are ca. 15 × 3–4 mm, curved-reflexed, greyish green, regularly arranged, without hyaline border and without an apical corniculation. Inner phyllaries are not coalescent. Capitulum is ca. 50 mm in diameter, medium dense, convex. Ligules are flat or slightly canaliculated, medium yellow, with yellow or dark apical ligule teeth. Ligule stripe is narrower than ligule, indistinctly reddish grey. Produces pollen. Stigmas are moderately discoloured. Achenes are straw-coloured, ca. 3,2–3,5 mm long (incl. the cone), spinulose in the distal part, the spinules are medium long and strong, incurved to straight. Achene cone is ca. 0,1–0,3 mm long, conical-cylindrical, smooth or ± spinulose. Rostrum length is 10–11 mm.

Discussion. *Taraxacum ossiclivosum* was in cultivation from 2002 to 2008. It is rare, identifiable by its very characteristic bright green leaves.

Distribution area: Eastern Finland, Sa and Kb.



Fig. 6A. Holotype of *Taraxacum ossiclivosum*. B. Achenes.

Pseudotypes cultivated of holotype seeds. **Finland.** **PK(Kb):** Joensuu, Linnunlahti, Botania experimental garden, cultivated from holotype, 10.VI.2004 J. Räsänen 4/163 (H 815885), 9.VI.2005 J. Räsänen 5/142 (S).

Paratypes. **Finland.** **ES(Sa):** Luumäki, Motel, roadside of the main road 6, on lawn, alt. 84 m. 26.V.2004 Juhani Räsänen 4/2. Pos. 60°57'36"N 27°48'20"E (Grid 27°E 67614:5438), (JR); **ES(Sa):** Savitaipale, centre, ABC-service station, roadside, on lawn, alt. 113 m. 26.V.2013 J. Räsänen 13/33. Pos. 61°11'28"N 27°39'55"E (Grid 27°E 67871:5359), (H 827564, JR); **PK(Kb):** Joensuu, Linnunlahti, Botania experimental garden, cultivated from paratype (Juhani Räsänen 4/2), 4.VI.2008 J. Räsänen 8/261 (H 815886, OULU 10002436, HØ, PO, JR); **PK(Kb):** Outokumpu, Kuusjärvi, roadside of the main road 17 near church, on lawn, alt. 127 m. 6.VI.2005 J. Räsänen 5/116 & P. Oosterveld. Pos. 62°42'04"N 28°55'19"E (Grid 27°E: 69566:5985), (PO, JR).

***Taraxacum sinus-avis* J.Räsänen, sp. nova**
(Fig. 7)

Holotype: Finland, **PK(Kb)**, Joensuu, Linnunlahti, Pajutie 1 A, S-side of the road, on lawn, alt 80 m. 2.VI.1997. Juhani Räsänen R298. Pos. 62°36'10"N 29°43'33"E (Grid 27°E 69472:6401) (H 819955).

Etymology: The location Linnunlahti, in English "Birds bay", in latin "Sinus-avis", is a suburb of Joensuu. *T. sinus-avis* is there common.

Planta subgracilis, 10–30 cm alta, rosula adscendente. *Folia* lanceolata, viridia vel obscure viridia parum glaucescentia, supra glabrescentia, omnia lobata, maculis dispersis nullis, petiolo angustulo vel anguste alato, purpureo, nervo medio viridi vel inferne parce rubescente, striolis colorat-



Fig. 7A. Holotype of *Taraxacum sinus-avis*.
B. Achenes.

is carentibus. *Lobi laterales* utrinque c. 3–5, angusti (tantum in individuis novellis lati), irregulares, saepe profunde fissi, in foliis exterioribus saepe \pm deltoidei, margine distali integro vel denticibus paucis instructi, margine proximali integro, apice subacuto. *Lobus terminalis* plerumque parvus, hastatus, tamen interdum in foliis interioribus magnus, in apicem fere elongatum protractus. *Interlobia* plerumque angulata, plana, viridia. *Scapi* arcuati fere folia longi, sub involucrio valde araneosi, ceterum subaraneosi vel \pm glabrescentes. *Involucrium* viride vel obscure viride, parce pruinatum, basi rotundata. *Squamae exteriores* c. 13–18 \times 3 mm, canescenti-virides, plures curvato-reflexae, singulae irregulares, margine

non hyalino. *Squamae interiores* latitudine inter se fere aequales. *Calathium* c. 40–50 mm diametro, medio-criter densus, fere planum. *Ligulae* obscure luteae, planae vel parum canaliculae, marginales subtus stria canoviolacea angustiore ornatae, denticulis apicalibus luteis vel parce rubris. *Antherae* polliniferae. *Stigmata* virescentia. *Achenium* fusco-stramineum, pyramide inclusa c. 3,6–4,0 mm longum, superne spinulis mediae longitudinis vel longissimis subrobustis rectis vel incurvis instructum, pyramide c. 0,6–0,8 mm longa, cylindrica, laevi vel parce spinulosa. *Rostrum* c. 11–12 mm longum. *Pappus* albus.

Taraxacum sinus-avis is a medium-sized, 10–30 cm tall, with ascending rosette. Leaves are medium or dark green, faintly bluish, glabrescent, unspotted. Petioles are narrowly winged, purple. Midrib is green to faintly reddish, not striolate. All leaves are distinctly lobed, lateral leaf lobes are irregular, often dissected, in outer leaves often \pm recurved, entire or with some tooth in upper mar-



Fig. 8. Pseudotype of *Taraxacum sinus-avis*.

gin, proximal margin is entire, tip acute. Terminal lobe is usually small, spear-shaped, however sometimes in inner leaves large, with elongate or linguat tip. Interlobes are usually angular, flat, green. Scapes are ascending, usually as long as leaves, distinctly arachnoid, especially under involucre, but sometimes throughout. Involucre is pale to dark green, indistinctly pruinose. Outer phyllaries are ca. 13–18 × 3 mm, greyish green, majority curved to reflexed, but some irregularly directed, without hyaline border. Capitulum is ca. 40–50 mm in diameter, medium dense, usually flat. Ligules are dark yellow, flat or slightly can-

aliculated with yellow or dark apical ligule teeth. Ligule stripe is narrower than ligule, indistinctly greyish violet. Produces pollen. Stigmas are discoloured. Achenes are greyish brown, ca. 3,6–4,0 mm long (incl. the cone), spinulose in the distal part, the spinules are medium long or very long, medium strong, straight to incurved. Achene cone is ca. 0,6–0,8 mm long, cylindrical, smooth or scarce spinulose. Rostrum length is 11–12 mm.

Discussion. *Taraxacum sinus-avis* was in cultivation from 1998 to 2008. The closest morphological relative is *T. glossocentrum* Dahlst. (Haglund 1934), a widespread species. The latter one is on average much taller and more erect, the scapes are longer than leaves. When cultivated aside, leaves of young *T. sinus-avis* are shorter, broader and more obtuse than in *T. glossocentrum*. Another closely related species, *T. glosodon* Sonck & H. Øllg. (Sonck & Øllgaard 1999), is also distinctly taller, outer phyllaries are broader and achenes bigger. *T. sinus-avis* favor open sites such as roadsides, shed of fences and new lawns.

Distribution area: Southern and Eastern Finland, Northern Sweden.

Pseudotypes cultivated of holotype seeds. **Finland.** PK(Kb): Joensuu, Linnunlahti, Pajutie 1 B 4, experimental garden, 30.V.1999 J. Räsänen T129 (H 819954, OULU 10002437); 1.VI.2000 J. Räsänen U194 (S, HØ); 17.V.2001 J. Räsänen 1/22 [H 819953 (Fig. 8)].

Paratypes. **Finland.** V(Ab): Lohja, centre, Asemakatu 4, roadside, on lawn, alt. 54 m, 24.V.2007 J. Räsänen 7/168 & E. Reinikka. Pos. 60°15'19"N 24°03'56"E (Grid 27°E: 66862:3377), (H 819952, OULU 10002439, JR); U(N): Espoo, Nöykkiönlaakso, Oxfotinkuja, Oxfot park, on lawn, alt. 15 m, 23.V.2007 J. Räsänen 7/156. Pos. 60°10'02"N 24°39'44"E (Grid 27°E: 66751:3703), (H 819951, JR); PK(Kb): Joensuu, Linnunlahti, Pajutie 1 A, on lawn, alt. 80 m. 9.VI.1998 J. Räsänen S196. Pos. 62°36'10"N 29°43'33"E (Grid 27°E 69472:6401), [H 819950 (Fig. 9)]; PK(Kb): Juankoski, Säyneinen, Viitaniemi, road verge of road 570 near school, alt. 104 m, 11.VI.2000 J. Räsänen U279. Pos. 63°08'18"N 28°28'30"E (Grid 27°E: 70047:5745), (H 819938, HØ, JR); PK(Kb): Outokumpu, Kuusjärvi, road verge of main road 17 near church, alt 127 m, 7.VI.2000 J. Räsänen U245. Pos. 62°42'03"N 28°55'22"E (Grid 27°E: 69566:5986), (OULU 10002438, HØ). **Sweden.** LL: Jokkmokk sn, Jokkmokk Notviken 200 m OSO husen, gammel vallodding, alt. 215 m. 15.VI.2005 L. Stenberg nb05 0109. Pos. 66°35'23"N 19°54'05"E (RUBIN 26J 8g 39 16), (S-A12114-48), det. H. Øllgaard 2012.



Fig. 9. Paratype of *Taraxacum sinus-avis*. Specimen of young individual.

***Taraxacum subinvestiens* J. Räsänen sp. nova**
(Fig. 10)

Holotype: Finland, PK(Kb), Joensuu, Käpykangas, Kuurnankatu, roadside near Kaltimontie 1, on lawn, alt. 81 m, 4.VI.2009 Juhani Räsänen 9/162. Pos. 62°37'09"N 29°46'08"E (YKJ 69491:36422) (H 817555). Isotypes OULU 10002440, S, JR.

Etymology: Morphology resemble that of *T. investiens*.

Planta mediae magnitudinis, 20–45 cm alta, rosula suberecta. *Folia* late lanceolata, obscure viridia, glabrescentia, omnia lobata, maculis dispersis nullis, petiolo angusto, obscure pallide violaceo, folia exteriora interdum viridia, nervo me-

dio viride. *Lobi laterales* utrinque 4–5 fere patentes, integri vel profunde fissi, margine distali irregulare, saepe dentibus varie longis robustis ornatis, proximali fere recto, apice peracuto. *Lobus terminalis* valde varius magnitudine, saepe fissus vel dentibus robustis ornatus, apice acuto vel longe protracto. *Interlobia* rotundata, plana, parce piceo-maculata. *Scapi* sub involucro valde araneosi, ceterum glabrescentes. *Involucrum* obscurius viride, parce pruinatum. *Squamae exteriores* ca. 13–14 × 3–4 mm, obscure canescenti-virides, regulares, patentes vel arcuato-reflexae, margine angustissime hyalino. *Calathium* 40–50 mm diametro, mediocriter densum, convexum. *Ligulae* obscure luteae, planae vel canaliculatae, marginales subtus striatae canescente angustiore ornatae, denticulis apicalibus luteis. *Antherae* polliniferae. *Stigmata* virescentia. *Achenium* fusco-stramineum, pyramide inclusa ca. 3,9–4,0 mm longum, superne spinulis brevibus, modice robustis rectis instructum, pyramide ca. 0,5–0,7 mm longa cylindrica laevi vel parce spinulosa. *Rostrum* 11–12 mm longum.

Taraxacum subinvestiens is ca. 20–45 cm tall, with suberect rosette. All leaves are lobed, darkish mid green, glabrescent, unspotted. Petioles are narrow, obscure pale purple, outer petioles sometimes greenish. Midrib is greenish. Lateral leaf lobes are ± patent, undivided or with clefts.



Fig. 10A. Holotype of *Taraxacum subinvestiens*. B. Achenes.

Distal lobe margin is irregular, often with teeth of variable size. Proximal lobe margin is \pm straight, entire. Terminal lobe is very variable of size, often dissected or with robust teeth, often with well-differentiated tip. Interlobes are broadly rounded, flat, with faint or lacking tar-colour. Scapes are mainly hairy under the involucre, elsewhere glabrescent. Involucres are dark green, indistinctly pruinose. Outer phyllaries are ca. $13\text{--}14 \times 3\text{--}4$ mm, \pm dark grayish green, rather regularly arranged, patent or curved-reflexed, with flat narrowly hyaline border. Capitulum is 40–50 mm in diameter, medium dense, with a \pm convex profile. Ligules are flat or canaliculated, dark yellow, with yellow ligule teeth. Outermost ligules are striped-

ly grayish. Produces pollen. Stigmas are discoloured. Achene is grayish brown ca. 3,9–4,0 mm long (incl. cone), in upper part with short, medium or robust, straight spinules. Achene cone is ca. 0,5–0,7 mm long, cylindrical, smooth or with a few spinule. Rostrum is 11–12 mm long.

Discussion. The closest morphological relative of *Taraxacum subinvestiens* is *T. investiens* Railons. (Railonsala 1967). In the latter petioles have usually a lucid red colour, and they are often narrowly winged. Midrib of inner leaves is also red. Leaves tips of lateral and terminal lobes are more obtuse. Outer phyllaries are more strongly reflexed and with \pm purplish tips. Achenes and rostrum are shorter.



Fig. 11. Paratype of *Taraxacum subinvestiens*.

Taraxacum subinvestiens was in cultivation from 2001 to 2010, which revealed that the shape of the leaves is very variable, depending on the plant age and condition. In juvenile leaves the terminal leaflets are broader and interval of other leaflets are narrower when compared to mature leaves.

Distribution area: Eastern Finland (Joensuu).

Paratypes. **Finland.** PK(Kb): Joensuu, Salpakangas, Aspitie 1, on lawn between road and parking place, alt. 84 m, 2.VI.2000 J. Räsänen U202 (young individual). Pos. 62°37'42"N 29°46'55"E (Grid 27°E 69501:6429) (JR); PK(Kb): Joensuu, Linnunlahti, Botania, experimental

garden, cultivated from paratype seeds (Juhani Räsänen U202), 8.VI.2005 J. Räsänen 5/130, (H 817556, OULU 10002441, HØ, JR); PK(Kb): Joensuu, Linnunlahti, Pajutie 1 B 4, experimental garden, cultivated from paratype seeds (Juhani Räsänen U202), 31.V.2009 J. Räsänen 9/99 (OULU 10002442, JR); 1.VI.2009 J. Räsänen 9/134 [H 817557 (Fig. 11), JR]; 3.VI.2010 J. Räsänen 10/118 (MK); PK(Kb): Joensuu, Käpykangas, Voimatie 10, E-side of the road, alt. 82 m, 5.VI.2010 J. Räsänen 10/142. Pos. 62°37'08"N 29°46'45"E (YKJ 69491:36428) (H 817566, OULU 10002443).

Taraxacum volitans J. Räsänen, sp. nova (Fig. 12)

Holotype: Finland, PK(Kb), Joensuu, centre, Rantakatu 30, side of S-wall, on lawn, alt. 80 m, 14.V.2001 Juhani Räsänen 1/13. Pos. 62°36'12"N 29°46'05"E (Grid 27°E 69473:6423) (H 817558).

Etymology: Side lobes often flutter in the wind (in lat-in volitare).

Planta 20–30 cm alta, rosula suberecta. *Folia* canescenti-viridia, supra glabrescentia, paullum nitida, petiolis ± alatis, obscure purpureis, foliorum exteriorum interdum pallidis, nervo medio viridi vel plerumque sordidescente, interdum striolato. *Lobi laterales* utrinque ca. 3–5, deltoid-ei, margine distali irregulare, fere integro vel interdum lobulato dentate, proximali integro, apice caudato. *Lobus terminalis* sat magnus, saltem in foliis interioribus, hastato-sagittatus, saepe fissus, apice acuto vel acuminato. *Interlobia* rotundata vel subangulata, ± plicata, viridia. *Scapi* sub involucre varie araneosi, ceterum glabrescentes. *Involucreum* viride vel obscure viride, parce pruinatum. *Squamae exteriores* ca. 14–15 × 3 mm, canovirides, irregulares curvato-reflexae vel retroflexae, margine non vel angustissime tantum hyalino. *Calathium* ca. 40–45 mm diametro, laxum vel mediocriter densum, planum vel paullum convexum. *Antherae* polliniferae. *Stigmata* virescentia. *Achenium* fusco-stramineum, pyramide inclusa ca. 3.6–3.9 mm longum, superne spinulis mediae longitudinis, modice robustis saepe paulum squamosis, rectis instructum, pyramide ca. 0.4–0.6 mm longa conica-cylindrica laevi. *Rostrium* 10–11 mm longum.

Taraxacum volitans is a medium-sized species with a suberect rosette. Leaves are greyish green, glabrescent, slightly shiny. Petioles are ± winged, obscure purple, outer petioles sometimes greenish. Midrib is green to indistinctly reddish



Fig. 12A. Holotype of *Taraxacum volitans*.
B. Achenes.

or brownish, sometimes striolate. Lateral leaf lobes are recurved (shaped deltoid), usually undivided, but sometimes with clefts, with irregular distal margin, lobe apices caudate. Distal margin is usually entire, proximal margin entire. Terminal lobe is larger than the lateral lobes, at least on inner leaves, often dissected, acute to acuminate. Interlobes are broadly rounded to indistinctly angular, \pm plicate, green. Scapes are variably hairy under the involucre, elsewhere glabrescent. Involucre is pale to dark green, indistinctly pruinose. Outer phyllaries are ca. $14\text{--}15 \times 3$ mm, greyish green, irregular curved-reflexed to deflexed, margin is without a border or it is very faintly bordered. Capitulum (Fig. 13) is 40–45 mm in di-

ameter, lax or medium dense, with flat or slightly convex profile. Ligules are flat or canaliculated, medium yellow, with yellow ligule teeth. Outermost ligules are striped reddish and grey. Produces pollen. Stigmas are discoloured. Achenes are greyish brown, 3,6–3,9 mm long (incl. cone), spinulose in the distal part, the spinules are medium long, medium strong, often slightly squamulose, straight. Achene cone is ca. 0,4–0,6 mm long, conical-cylindrical, usually smooth. Rostrum length is 10–11 mm.

Discussion. *Taraxacum volitans* was in cultivation from 2002 to 2009. It is a rare species, which is identifiable by its characteristic leaves. The closest morphological relative of *T. cabanaeforme* are *T. gustavianum* Sonck (Sonck 1988) and *T. interveniens* Hagl. (Haglund 1937). *T. gustavianum* is usually noticeable bigger and its petioles are narrower and there are more pairs (6–8) of lateral leaf lobes. Small *T. gustavianum* may be mixed with *T. volitans*. *T. interveniens* is a more robust species and its petioles are more deeply red and outer phyllaries are curved more extensively outwards.

Distribution area: Eastern Finland (Joensuu).



Fig. 13. Capitulum of *Taraxacum volitans*.

Pseudotypes cultivated of holotype seeds. **Finland.**

PK(Kb): Joensuu, Linnunlahti, Botania experimental garden, cultivated from holotype, 2.VI.2003 J. Räsänen 3/163 (H 817559, HØ); **PK(Kb):** Joensuu, Linnunlahti, Pajutie 1 B 4, experimental garden, cultivated from holotype, 31.V.2008 J. Räsänen 8/205 (S); 3.VI.2009 J. Räsänen 9/145 (H 817560, OULU 10002444, JR).

Paratypes. **Finland.** **(PK)Kb):** Joensuu, centre, Torikatu 11, side of E-wall, on lawn, alt 81 m. 25.V.2008 J. Räsänen 8/128. Pos. 62°35'50"N 29°45'36"E (YKJ 69466: 36419) (H 817561, OULU 10002445).

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