

TARAXACUM SPECIES FROM INDIA, PAKISTAN AND NEIGHBOURING COUNTRIES

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(*s-Gravenhage*)

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1. INTRODUCTION

It is not the intention of this paper to give a complete survey of the *Taraxacum* species occurring in this enormous area, which is nearly as large as Europe. The material that has been collected, is certainly not representative enough to this end and, moreover, not all the samples that have been collected, are sufficiently complete to meet the demands of a study in this difficult genus. Finally, I have not been able to examine the material present in all Herbaria, and although Directors and Keepers of many collections have put material at my disposal, I have mainly drawn from the Herbaria in India and Pakistan, from those of Geneva, Kew, London and Munich and from my own *Taraxacum* collection, which is included in the State Herbarium, Leyden. My own herbarium mainly consists of specimens collected by myself and my companions in 1959, and to a smaller degree of those collected by Ir. H. M. Heybroek in 1960 and by Dr. Harbhajan Singh and collaborators in 1961.

My trip to the Himalaya, which lasted two months only, was supported by the Netherlands Organization for Pure Scientific Research (ZWO), which gave me a compensation for the costs of preparing and transporting the collected material and assisted me by the loan of some technical equipment. Through the Netherlands Foreign Office the Indian Government was informed of my visit. It lent me important assistance, through the intermediary of the Indian Agricultural Research Institute, New-Delhi: two botanists accompanied me, the first, Mr. S. P. Mital, on my eastern trip, the other Dr. Harbhajan Singh on the western ones. The late Dr. D. Chatterjee accompanied me on an expedition along the Singalilla ridge, which is situated on the border of India, Nepal and Sikkim.

The achenes of *Taraxacum*, which I brought home, were sown mainly in the grounds of the Delft Botanical Garden, but partly also in those of the Leyden Botanical Gardens with the assistance of their staffs. The assistance of Mr. Mulder (Delft) and his gardeners made it possible that even now, three years later Himalayan *Taraxaca* are still alive, although the situation in this country, which regard to soil and climate, is totally different.

The photographs published here, were taken by Mr. Marks with the authorization of the Director of the State Herbarium, Leyden.

2. ACKNOWLEDGEMENTS

For the way in which ZWO, the Netherlands Foreign Office and, especially the Indian Government supported me, I should like to express my indebtedness, especially obliged I am to Dr. B. P. Pal, Director of the Indian Agronomical Research Institute, New Delhi. Extremely thankful I am to both my companions. The assistance obtained from other persons mentioned in the Introduction, is gratefully acknowledged.

3. GENERAL SURVEY

The Himalayan region is of special interest to those who study *Taraxacum* from a geographical and a systematical point of view. In Blumea (1958) I suggested in agreement with the opinion of VON HANDEL-MAZZETTI (1907) that the origin of this genus may be found in the north-western Himalayas, E. Turkestan and Pamir.

Whilst in Europe, East Asia and in the boreal-subarctic regions only a few sections occur, though with a most surprising and confusing abundance of (micro-) species, in the region considered here, the number of sections is larger but their splitting up in smaller unities seems to have proceeded less far.

Eleven sections are known from here and 75 species are dealt with in this study.

The eastern region of the Himalaya is relatively poor in *Taraxacum* species, the western, on the other hand, is extremely rich: in many respects the *Taraxacum* flora in these two parts is quite different. There is also a great difference between the northern Transhimalayan (and Tibetan) flora and the flora of the southern slopes of the main Himalayan chain, but this difference seems to fade away in the northwestern region. The subtropical part of India and Pakistan is extremely poor in *Taraxacum* species: *T. wallichii* enters this region and *T. javanicum* is sporadically present.

4. SECTIONS

The sections within *Taraxacum* seem to be rather well established so long as we confine our attention to Europe but the same cannot be said of those found in Asia. Handel-Mazzetti in his important Monograph of 1907, recognized several sections which are of interest for Asia and for the region considered here but some of them will have to be split up whereas others will have to be amended. The same may be said of several of the species recognized by him.

The *Rhodotricha* HM. 1907 will have to be split up in sect. *Rhodotricha* sens. strict. (not present in the region considered), sect. *Leucantha* v. S. and sect. *Oligantha* v. S., the latter including some species that were referred by v. Handel-Mazzetti to another section.

The *Scariosa* HM. 1907 will have to be split up in sect. *Scariosa* HM. em. Dahlst. 1929, sect. *Obovata* v. S. 1954 and sect. *Macrocornuta* v. S., of which only the last one is of interest here.

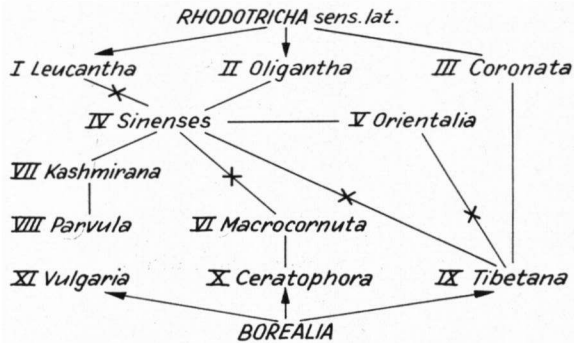
The *Borealia* HM. 1907 have been already split up by Dahlstedt, by Haglund, and by myself in several sections. For the region considered here the two following ones are of interest, viz. sect. *Ceratophora* Dahlst. and sect. *Vulgaria* Dahlst., whereas sect. *Tibetana* v. S. is a new one belonging to this circle of affinity.

The *Parvula* HM. 1907 will have to be split up in sect. *Parvula* HM. sens. strict. and sect. *Kashmirana* v. S., but one of the species, viz. *T. brevirostre* HM. is to be removed to sect. *Oligantha*.

A new sect. *Sinensia* will have to be set up for some species from C. Asia which were hidden in HM. 1907 in *Rhodotricha* and in the superspecies *T. paludosum* Schlecht.

The (critical) sect. *Coronata* HM. 1907 is to be maintained, and this applies also to sect. *Orientalia* HM. 1923.

Thus, the total list of sections becomes as shown below: a scheme is added which illustrates my ideas on some of the relationships.



In the scheme arrows indicate developments starting from Handel-Mazzetti's supergroups; crosses indicate the existence of intermediate forms.

GEOGRAPHICAL DISTRIBUTION

| | IN GENERAL | IN THE REGION CONSIDERED |
|------------------------------------|--|---------------------------------------|
| i. Leucantha v. S. s.n. | C. Asia | N.W. Himalaya |
| ii. Oligantha v. S. s.n. | W. and C. Asia | N.W. Himalaya |
| iii. Coronata HM. | C. Asia? | N.W. Himalaya |
| iv. Sinensia v. S. s.n. | C. Asia | N. Himalaya |
| v. Orientalia HM. | W. Asia | N.W. Himalaya |
| vi. Macrocornuta v. S. | W. Asia | N.W. Himalaya, entering the plains |
| vii. Kashmirana v. S. s.n. | W. Himalaya | W. Himalaya |
| viii. Parvula HM. em. v. S. | Himalaya | Himalaya |
| ix. Tibetana v. S. s.n. | eastern part of C. Asia | mainly N. Himalaya |
| x. Ceratophora Dahlst. | Boreal and Arctic region, some endemic on high mountainous chains to the South. | Himalaya |
| xi. Vulgaria Dahlst. | Europe and W. Asia, else- where introduced | Himalaya, India, (Java). |

5. ACHENES

5a. *Shape of the achenes*

The achenes play a predominant role in the characterization of the sections. Mostly the achene body (Fig. 1) is more or less abruptly narrowed into an upper part of conical (a) or cylindrical (b) form (the "pyramid"); sometimes it is very gradually and insensibly elongated into the latter (c), rarely in such a way that the upper part is hardly recognizable (d).

The spinules, which are mostly present at the apex of the body or also lower down, pass but rarely and then in a small number only into the contracted upper part, i.e. into the pyramid. Sometimes the spinules are broad and scale-like, in some cases partly tricuspidate.

The rostrum (beak) is mostly well developed, thin and longer than the achene itself, rarely thick and shorter than the achene and very rarely absent.

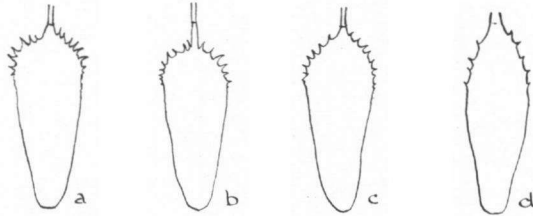


Fig. 1. Achenes (schematic)

5b. *The pappus*

The *Taraxacum* species mostly have a pure white pappus; those with a distinctly coloured (brownish or pale violet) pappus are restricted to a limited area which has western Asia as its centre and extends westward to south-western Europe and eastward into central Asia; the species belong to the *Rhodotricha* HM (sens. lat.)¹⁾ and to sect. *Coronata* HM; according to HM 1907, a coloured pappus would be a primitive character. Species with a slightly coloured (i.e. dirty white) pappus are mixed in several sections with species having a pure white pappus. This happens in sect. *Scariosa* HM em. Dahlst., in sect. *Eu-Erythrocarpa* Dahlst. em. v. S. and in sect. *Spuria* DC, and, moreover, as mentioned below it occurs in sect. *Oligantha* v. S., in sect. *Kashmirana* v. S. and in sect. *Tibetana* v. S.

5c. *The colour of the achenes*

The major part of the *Taraxacum* species have straw-coloured or light brown achenes; very dark-brown (reddish or blackish) ones occur in some arctic, arcto-alpine and antarctic species.

¹⁾ I am indebted to Dr. A. Gilli, Vienna, who with good reason criticized by letter 1962 my identification of some plants from Iran (lit. 6) as *T. fulvipile* Harvey, which — at least for a major part — are *T. bessarabicum* (Hornem) Besser. Both species belong to sect. *Rhodotricha* HM.

Fulvous, reddish brown or brown-red achenes are rather frequent. Most of the species of sect. *Erythrosperma* Dahlst. em. Lindb. f., sect. *Eu-Erythrocarpa* Dahlst. em. v. S. and sect. *Rhodocarpa* v. S. (all mainly European) have reddish achenes.

For a rather long period it was a matter of debate whether the colour of the achenes would be important enough to be used for the characterization of sections or species. Stork (Bull. Torrey Bot. Club 47, 1920, p. 199) states that the red colour may be suppressed under certain circumstances, by external influences. In other papers changes in colour are reported; however, part of these statements certainly must be considered to be not critical enough. On the other hand, Haglund (1946) collected forms, belonging to sect. *Erythrosperma* which possessed pale-coloured achenes, whereas the achenes normally are reddish in these forms. In sect. *Obovata* v. S. I found (1954) in *T. obovatum* (Willd.) DC no specific difference between red- and yellow-coloured forms and the same situation was found in some W. Asian species belonging to sect. *Eu-Erythrocarpa* Dahlst. em. v. S. (1960). In this study more examples will be given.

In the area considered here, reddish (fulvous, red-brown) achenes occur in the majority of species belonging to sect. *Parvula* HM em. v. S. and less often in sect. *Sinensia* v. S., sect. *Macrocornuta* v. S., sect. *Kashmirana* v. S. and sect. *Tibetana* v. S.

In sect. *Kashmirana* v. S. in an intermediate stage of ripening the prevalence of an orange, fulvous or pale reddish tinge is present in the colour of the achene; this prevailing tinge, however, disappears in the ripe achene, which is light or darker but always neutral brown.

6. KEY TO THE SECTIONS

- 1a. Rostrum absent or thick; pappus often more or less slightly coloured 2
- b. Rostrum thin; pappus pure white, rarely slightly coloured 3
- 2a. Ligulas white sect. *Leucantha*
- b. Ligulas yellow sect. *Oligantha*
- 3a. Pappus slightly coloured (dirty white, brownish) 4
- b. Pappus pure white 5
- 4a. Spinules on the achene apex spreading, forming a kind of crown sect. *Coronata*
- b. Spinules at the achene apex erect or spreading, but not forming such a crown sect. *Tibetana* p.p.
- 5a. Achenes insensibly narrowed into a conical top (pyramid) 6
- b. Achenes in the upper part abruptly or semi-abruptly narrowed into a pyramid 8
- 6a. Achenes (straw-coloured or pale brown) slightly spinuliferous; outer involucre bracts distinctly two-coloured viz. dark green with a sharply defined white margin sect. *Orientalia*
- b. Achenes (straw-coloured, fulvous or reddish) densely spinuliferous. Outer bracts green with a mostly wide whitish or greenish margin, which is not very sharply delimited against the central part of the bract 7

- 7a. Leaves narrow, long, pluri-lobate (5-6 lobes on each side); involucre narrow, pale green; achenes straw-coloured or pale brown, rarely fulvous sect. *Sinensia*
 b. Leaves wider, shorter, generally with a smaller number of lobes; achenes often fulvous or reddish sect. *Parvula*
- 8a. Top part of the achene (pyramid) cylindrical, mostly 1 mm long 9
 b. Top part (pyramid) conical, often shorter 10
- 9a. Involucral bracts with horns; the outer ones not distinctly rotundate or semi-auriculate at their base sect. *Macrocornuta*
 b. Involucral bracts at most with small gibbosities; the outer ones often distinctly rotundate or semi-auriculate at their base sect. *Kashmirana*
- 10a. Involucre and styles and stigmas (in dried condition) black or nearly so sect. *Tibetana*
 b. Involucre green (also in dried condition); styles and stigmas yellow, dirty yellow or greenish. 11
- 11a. Involucral bracts with horns sect. *Ceratophora*
 b. Involucral bracts without horns or gibbosities sect. *Vulgaria*

As this key is but short, it might in some cases offer difficulties, mainly caused by the fact that a few species have been included in a definite section, though in reality they occupy an intermediate position between two sections.

ABBREVIATIONS

- Dahlst. H. Dahlstedt
 DC. A. De Candolle
 Hagl. G. Haglund
 HM. H. von Handel-Mazzetti
 v. S. J. L. van Soest
 h herbarium; an h not followed by another abbreviation means h. v. S.; for the additional abbreviations see Lanjouw & Stafleu, Index Herbariorum I, The Herbaria of the World; Regnum Vegetabile 15
 ! with exclamation (!) under "area" are quoted specimens seen by v. S. from the district or country mentioned; under "localities" specimens of which the identification by the collector or by some one else has been verified by v. S.; if absent, the identification is by v. S.

I. SECT. LEUCANTHA V. SOEST SECT. NOV.

Plantae parvae. Ligulae albae. Achenia subcrasse rostrata; pappus rubellus vel raro sordide albus. Asia centralis.

The typical species is *T. leucanthum* Ledebour. I agree with HM 1907 that there exists a large morphological gap between this species and all

other species of *Taraxacum*. In HM's sense it nevertheless belongs on account of the coloured pappus to sect. *Rhodotricha*.

There exist two species that are related to *T. leucantha* but differ from it, by a thin rostrum and a nearly white pappus. Both have white ligulas and seem to occupy an intermediate position between sect. *Leucantha* and sect. *Sinensia*; they are *T. dealbatum* HM and *T. luridum* Hagl.; the first probably does not belong to the Himalayan flora.

White flowers are rare in *Taraxacum* and are only known in Asiatic species; viz in *T. albidum* (Makino) Dahlst. from Japan, belonging to sect. *Mongolica* Dahlst.; in *T. arcticum* (Trautvetter) Dahlst. f. *albiflorum* (Kjellman) Dahlst. and in *T. hyparcticum* Dahlst. both belonging to sect. *Arctica* Dahlst., from the arctic region; and in *T. sikkimense* HM (with nearly whitish flowers) from Tibet and neighbouring countries, belonging to sect. *Tibetana* v. S.; furthermore in the species of sect. *Leucantha*.

Taraxacum leucanthum (Ledebour 1833) Ledebour 1844 p. 815, proparte, c. icon.; v. Handel-Mazzetti 1907 sens. lat., c. icon.; Haglund 1938.

Area (map I): Russian! and Chinese Turkestan!, Altai, Mongolia, Tibet!, N.W. Himalayan region!

Localities (in the Himalayan region);

Chitral: Yarkhun, 3600 m, 24.6.1958, Bowes Lyon 1001 (h. BM).

Gilgit: Giles (h. DD); the same material identified by HM in h. K!, see also HM 1907.

Lahul: Serchu, in marshes, 3900 m, 30.6.1941, Bor 15110 (h. DD!, identified by Raizada; h. K).

——: Serchu, in wet grassy meadow, 4200 m, 21.6.1931, Koelz 2081 (h. W!, identified by HM; h. RAW).

Ladakh: Bragnag, in wet meadow, 4050 m, 31.8.1931, Koelz 2773 (h. RAW, h. W, identified by HM as "*leucanthum-dealbatum intercedens*"); the outer involucre bracts are narrow.

——: Gya, 4950 m, 25.7.1941, Ludlow & Sherriff 8530 (h. BM) and 4000 m, 15.7.1941, 8495 (h. BM).

——: Murgo, Karakoram Trade Route, 4650 m, 27.7.1928, Ludlow 446 (h. BM).

——: Tsakzhun Tson, along stream, 4500 m, 21.7.1931, Koelz 2400 g (h. M).

Rupshu: Lachalung Pass, VIII 1913, Stewart (h. RAW).

——: Puga, in sedge meadow, 4650 m, 4.7.1931, Koelz 2191 (h. DD, h. K).

Spiti: Parang La ("between Naini Tal and Srinagar"), 4500 m, Benham (h. BM).

.....: Namrana (?) Pass, Kopai (or Ropar ?) Mani, 3000–3600 m, 1919, Benham (h. BM).

A few other localities are mentioned by HM 1907. Often *T. leucanthum* has glabrous scapes, but e.g. the plants collected by Koelz 2081 (Lahul) have hairy ones.

Taraxacum luridum Haglund, in Persson (1938) p. 307–309, c. icon.

Area: E. Turkestan!, Afghanistan!, N.W. Himalaya!

Localities:

Chitral: Tirich Mir, above Romosto, 3500–4200 m, Kerstan 1557 (h. W).

In the Delft Botanical Garden I am cultivating plants of unknown origin send to me as *T. leucanthum*, but actually belonging to *T.*

luridum. Haglund, in describing this species, did not have living plants at his disposal, which is the reason why he mentioned a probably pale yellow colour for the ligulas. In the living plants the ligulas are pure white inside, yellow at their base and streaked lovely purplish on the outside, whilst the inner flowers are yellow; in dried specimens the flowerheads give the impression of being pale yellow. The pappus is dirty white, i.e. less distinctly coloured than in *T. leucanthum*.

II. SECT. OLIGANTHA V. SOEST SECT. NOV.

Plantae parvae, basi lanigerae; folia saepe dense araneosa; involucria interdum araneosa. Ligulae saepe paulo numerosae. Floret aestate. Achenia mediocria 4–5 mm longa, in pyramidem sensim abientes; rostrum achenio brevius, interdum nullum, crassiusculum; pappus albus vel perpallide brunnescens.

Type species: *T. oliganthum* Schott & Kottschy.

Besides *T. oliganthum* (according to HM 1907 belonging to sect. *Rhodotricha* HM), known from western Asia, three other species belong to this section, viz. *T. amabile* v. S., from Nepal; *T. brevirostre* HM, according to HM 1907 belonging to sect. *Parvula* HM, known from western and central Asia; and *T. iranicum* v. S., from western Asia.

Taraxacum amabile v. Soest spec. nov.

Planta humilis ca. 5 cm alta basi dense lanigera.

Folia oblanceolata ca. 4 mm longa (petiolo pallido incluso) ad 6 mm lata integra vel minute denticulata raro breviter dentata.

Scapi tenues araneosi.

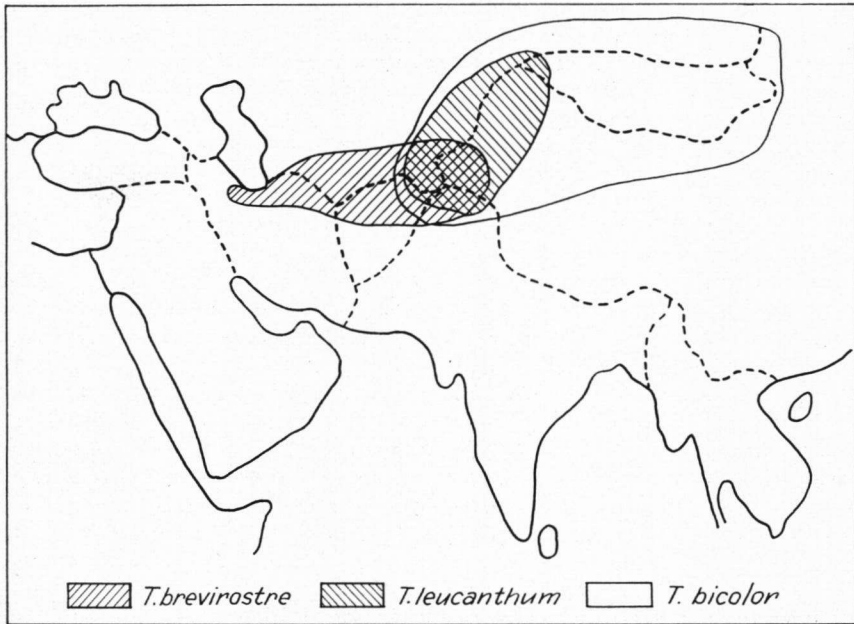
Involucrum paulo araneosum ± turbinatum 8 mm longum ad 6 mm latum. Squamae exteriores lineari-lanceolatae ad 5 mm longae 1–1,5 mm latae pallide virides minute callosae.

Calathium radians 1,5 cm latum. Ligulae (pallide?) luteae extus stria pallide cano-violacea notatae. Antherae polliniferae; stylus et stigmata pallide lutea.

Achenium stramineum 4 mm longum (pyramide inclusa) laeve vel supra minute tuberculatum, in pyramidem conicam sensim abiens; rostrum crassum 0–0,5 mm longum; pappus niveus 5 mm longus.

Typus: Nepal: Okhaldungagaon, S. of Dhorpatan, on open rocky slopes, 2.5.1954, Stainton, Sykes & Williams 417 (h. BM).

This is an interesting species, a primitive one in HM's sense; the rostrum is extremely short and the achene insensibly elongated into it. For this reason it might be placed in HM's sect. *Glacialia*, of which so far only one species is known, viz. from the mountains of S. Europe. On the other hand, *T. amabile* is allied to *T. brevirostre* HM, from which it is easily distinguishable by the very narrow, emarginate outer involucrial bracts. The abundance of araneous hairs in several parts of the plant points to a position within sect. *Oligantha*. The area of distribution of the other species of this section is limited to western and central Asia and *T. amabile* from Nepal thus presents an exception.



Map I.

Taraxacum brevirostre v. Handel-Mazzetti, Monogr. 1907, c. icon.; 1923, p. 260.

Area: Iraq!, Iran!, Afghanistan!, Turkestan! and Pamir!, Gilgit!, Ladakh! and Kashmir!, Tibet!; map I.

Localities:

Gilgit: Ghutbar, 4200 m, 16.7.1958, Bowes Lyon 54 (h. BM).

Ladakh: Danlat-beg-Öldi, Karakoram Trade Route, 4980 m, 5.8.1928, Ludlow 472 (h. BM).

—: Murgo, Karakoram Trade Route, 4650 m, 27.7.1928, Ludlow 446 pro min. parte (h. BM, with *T. leucanthum*).

Kashmir: Da, Rupshu, 4650 m, 11.7.1931, Koelz 2276 (h. RAW); "flowers yellow, streaked purplish outside".

The stigmas are pure yellow; pollen is present; the outer involucre bracts are dark green with a white margin.

III. SECT. CORONATA v. HANDEL-MAZZETTI 1907

Taraxacum coronatum HM 1907, c. icon.

Area: Kashmir. Compare a comment given under *T. heybroeckii* v. S. (sect. *Tibetana* v. S.).

IV. SECT. SINENSIA v. SOEST SECT. NOV.

Achenia straminea vel raro fulva 3–4 mm longa, in pyramidem longam sensim abientia, rostrata; pappus albus. Plantae graciles;

folia exteriora linearia vel anguste lingulata integra vel dentata, interiora angusta multilobata; lobi laterales utrinque 4–8. Calathia parva vel mediocria; ligulae luteae; involucria dilute viridia, squamae exteriores laxe adpressae saepe imbricatae late albo-marginatae callosae vel corniculatae.

Type species: *T. bicolor* DC.

From the *Kashmirana* v. S. and the *Leucantha* v. S. this section is distinguishable by the shape of the achene, which is gradually elongated into the pyramid; moreover, the *Leucantha* have white flowers and a more or less coloured pappus. The shape of the achenes is similar to that found in the *Parvula* HM em. v. S., which, however, differ in many respects, especially in leaf form, in the involucre and in general, less tender, appearance.

Apart from *T. bicolor*, the following species belong to this section: *T. asiaticum* Dahlst., *T. chitralense* v. S., *T. cuspidatum* Dahlst., *T. dasypodum* v. S. and *T. ladakense* v. S. Of these, *T. bicolor*, *T. chitralense* and *T. ladakense* belong to the Himalayan flora, being known from there only in the outermost northwestern part. The area of the section extends from here northwards into southern Siberia and eastwards into western China.

Taraxacum bicolor (Turczaninow 1830) De Candolle, Prodr. VII.1 (1838); *T. sinense* Dahlstedt 1926, c. icon.; *T. leucanthum* Ledebour 1844, pro min. parte.

Area: S. Siberia!, Mongolia!, N. and W. China!, Pamir!, Turkestan!, N.W. Himalaya!; Map I.

Localities:

Pakistan: Hazara, Daghoni to Sailing, 2400 m, 1.7.1955, Nasir & Webster 5922 (h. RAW).

Spituk: in meadow, 3150 m, 21.8.1931, Koelz 2684 (h. DD, RAW, W); "flowers yellow, outside washed purplish".

Ladakh: Nubra valley, Dshil, 2970 m, 5.7.1929, Ludlow 524 (h. BM).

—: Nubra valley, Hanle, Thomson (h. K); as "*leucanthum-dealbatum*" in HM 1907.

—: Shushal, under willows, 4350 m, VI. 1950 (?), Meinertzhagen (h. BM); "flowers lemon".

—: Shushal, in mud crusted over with white alcali, 4260 m, 24.7.1931, Koelz 2430 (h. RAW, W, in the latter identified by HM as *T. dealbatum* HM); "flowers yellow with strong purplish wash outside".

—: Sind valley, in front of Mud, in sand, 4200 m, 17.7.1931, Koelz 2355 (h. RAW, W, in the latter by mistake identified by me as *T. luridum* Hagl.).

—: Bragnag, 3900 m, 1931, Koelz 2788 (h. W).

—: Above Tsakzhun Tso, along stream, 4800 m, Koelz 2420 (h. RAW); "flowers yellow, not purplish outside"; verisimiliter.

Tibet occ. reg. alp., 4200–5400 m, Thomson (h. L) and 3600–5400 m (h. K).

It is not well understandable that HM 1907 identified *T. bicolor* with *T. paludosum* Schlecht., as he knew the original material collected by Turczaninow from Kiachtae; on p. 82 he discusses this point; he was perfectly right in separating *T. bicolor* from *T. leucanthum*, in opposition to Ledebour, who had combined these two species, con-

sidering the first to be a variety only of the second; *T. leucanthum* has white flowers and a coloured pappus. On the other hand, sect. *Palustria* Dahlst. (identical to the superspecies *T. paludosum*), a strictly European group, has achenes which are totally different, especially in shape. In relation to the fact that *T. bicolor* has distinct though small horns on the outer involucre bracts, HM states that in Europe *T. paludosum* may have gibbosities on the bracts; however, I myself have never seen any on the bracts of this species.

Dahlstedt, in giving to this species the name *T. sinense*, overlooked its resemblance to *T. bicolor*, and compared his new species mainly with *T. dealbatum* HM, which according to HM has white or pale yellow flowers and a dirty white pappus. *T. dealbatum* is as Dahlst. could prove a heterogeneous species; several plants, identified by HM as such, were recognized by Dahlst. either as *T. sinense* or as *T. cuspidatum* Dahlst. Haglund, later on, recognized in h. S the identity of *T. sinense* and *T. bicolor*.

In dried condition, specimens of *T. bicolor* without achenes and in which the colour of the flowers is not recognizable, are difficult to identify; in that case confusion with species of sect. *Leucantha* is possible. Probably *T. leucanthum* has darker coloured styles and stigmas, becoming blackish in dried condition.

Taraxacum chitralense v. Soest 1961.

Area: Chitral!

A photograph of the type material is reproduced here (Fig. 5).

This species is allied to *T. bicolor* DC, but the flower heads are larger and at their base ovate; pollen is absent; the leaves are lingulate, the inner ones having only short side lobes; the petioles are less distinctly purple and, partly, slightly alate. The colour of the flowers of *T. chitralense* seems to be pale yellow; the pyramid and the rostrum are shorter than in *T. bicolor*.

Taraxacum ladakense v. Soest **spec. nov.**

Planta humilis 5–8 cm alta ± glabra.

Folia canescenti-viridia linearia vel anguste lanceolata lobata ad 10 cm longa petiolo purpureo incluso; lobi laterales (utrinque ad 5) triangulares subacuti ad 1 cm longi patentes vel paulo retroversi integri; interlobiis 2–4 mm latis; lobus terminalis elongato-sagittatus vel elongato-deltaeoides 1–2 cm longus integer subacutus vel subobtusus.

Scapi 1–2, toti glabri.

Involucrum pallide viride 10 mm longum ca. 6 mm latum. Squamae exteriores imbricatae ovatae breves 2,5–4 mm longae inconspicue viridi-marginatae laeves.

Calathium paulo radians (?) ad 1,5 (?) cm diametro luteum. *Ligulae* marginales extus stria cano-violacea notatae. *Stylus* et *stigmata* laete lutea.

Achenium fulvum 5 mm longum (pyramide inclusa) superne argute spinulosum ceterum rugosum, basi laeve, in pyramidem conico-

cylindricam 1 mm longam subsensim abiens; rostrum 5 mm longum; pappus albus 5 mm longus.

Typus: Ladakh: above Bragnag, on watered slope, 4500 m, 3.9.1931, Koelz 2800 (h. RAW); "flowers yellow, washed outside greenish purple".

In sect. *Sinensia* this is the only species with fulvous achenes.

V. SECT. ORIENTALIA v. HANDEL-MAZZETTI 1923

The description, given by HM, may be repeated here: "Achenia majuscula vel magna, levia vel subtile tuberculata perpallide brunnea vel grisea usque atrogrisea, erostria vel rostro achenio paulo longiore. Pappus albus. Involucrum adpressum. Folia paulum vel non runcinata".

The severe restriction "levia vel subtile tuberculata" excludes many species that occur in Central-Asia, and which, in some way or another, resemble species belonging to this section.

HM 1923 p. 274 enumerates: *T. paradoxum* HM, *T. stevenii* (Sprg.) DC, *T. heteroloma* HM, *T. porphyranthum* Boiss. and *T. stenolepium* HM.

T. paradoxum, to be named: *T. kurdicum* HM ex Nábělek, is known only from Turkey and Iraq, cfr. v. S. 1960.

T. heteroloma is, according to Dahlst. 1926, a heterogeneous species. Probably only part of the forms included by HM, belong to this section, viz. those with large achenes (HM 1907, p. 120, fig. 6b) and with a broad margin to the outer involucral bracts; see under "species incertae sedis".

T. porphyranthum does not reach the Himalayan region; its area of distribution covers the Caucasus, Turkestan and northern Tibet.

T. stevenii will be discussed below; in its typical form it belongs to southwestern Asia; from the Himalayan region a related species is known.

T. stenolepium too will be discussed below.

Four new species are described, viz. *T. amblylepidocarpum*, *T. baltistanicum*, *T. melleum*, and *T. szovitsii*, of which the latter occurs in the Caucasian region and is only provisionally included in this section; probably it does not belong to it.

Taraxacum amblylepidocarpum v. Soest **spec. nov.** (Fig. 2a, b).

Planta humilis ca. 8 cm alta basi fragmentis foliorum veteriorum paulo incrassata.

Folia glauco-viridia ca. 10 cm longa (petiolo angusto roseola incluso) glabra lobata; lobi laterales utrinque ca. 4, superiores approximati, falcati vel anguste triangulares integri vel dorso 1 dente minuto instructi, ad 12 mm longi retroversi acuti; interlobiis inter lobos inferiores angustis ad 1 cm longis, denticulatis vel dentatis; lobus terminalis subsagittatus vel \pm deltoideus interdum indeterminato-sublobulatus; lobuli basales ad 8 mm longi \pm retroversi acuti; lobulus apicalis deltoideus acutus.

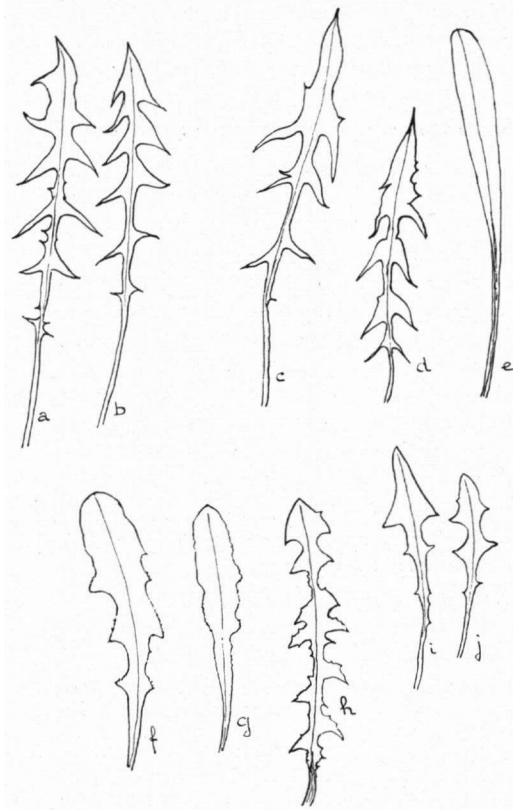


Fig. 2. a, b: *T. amblylepidocarpum*; c, d: *T. Nasiri*; e: *T. baltistanicum*; f, g: *T. aduncum*; h: *T. aduncum forma*; i, j: *T. melleum*.

Scapi ca. 2, floriferi foliis breviores, parce (sub involucri dense) araneosi.

Involucrum mediocre 10 mm longum 7 mm latum glaucescenti-rufoviride. Squamae exteriores adpressae apice recurvatae, lanceolatae 6 mm longae late albo-marginatae apice roseolae, omnes laeves vel inconspicue callosae.

Calathium flavum. Ligulae marginales planae, extus stria roseo-purpurea ornatae. Antherae vacuae (?); stylus et stigmata pallide lutea. Floret aestate.

Achenium pallide stramineum 6 mm longum (pyramide inclusa) superne breve squamulosum ceterum sublaeve-laeve, in pyramidem conicam ad 1 mm longam sensim abiens; rostrum 4 mm longum; pappus albus 6 mm longus.

Typus: Kashmir: Mt. Kolahoi, 3600 m, 16–20.8.1927, Stewart 9422 (h. K).

It is regrettable that only one specimen of this interesting species is available; the scaly spinules on the achenes are remarkable and in this form rare in *Taraxacum*.

***Taraxacum baltistanicum* v. Soest spec. nov.** (Fig. 2e).

Planta gracilis 5–20 cm alta tota glabra.

Folia lutescenti-viridia lanceolata obtusa raro sparso minute denticulata, ad 12 cm longa, petiolo longo angusto roseolo- vel purpureo-colorato incluso.

Scapi floriferi foliis subaequilongi vel ea breviter superantes.

Involucrum atro-viride. Squamae exteriores adpressae ovatae ad 5 mm longae ad 3 mm latae, late albo-vel roseolo-marginatae, apice callosae obtusae.

Calathium planum radians ad 3 cm diametro, flavum. Ligulae marginales planae extus \pm evittatae vel apice paulo roseolae vel dilute purpureae. Antherae parce polliniferae; stylus et stigmata laete lutea. Floret aestate.

Achenium maturum ignotum (dilute brunneum?, \pm laeve?), rostratum, pappus albus.

E sectione *Orientaliorum* HM.

Typus: Baltistan: Ghondokoro Glacier, 4050 m, 14.7.1955, Nasir & Webster 6104 (h. RAW).

Furthermore:

Baltistan: Burgi La, Deosai side, 4500 m, 31.7.1940, Stewart (h. RAW 20134).

—: Thalle La, 4500–4800 m, 15.8.1940, Stewart (h. RAW 20731).

Utter Pradesh: Manikeo Pass, grassy slope, 7.5.1948, Koelz (h. RAW 70292); "yellow, washed purplish outside"; verisimiliter: leaves broader and shortly dentate, stigmas dirty yellow, araneous hairs sparingly present.

***Taraxacum melleum* v. Soest spec. nov.** (Fig. 2i, j).

Planta parva ad 10 cm alta, basi fragmentis foliorum veteriorum incrassata.

Folia tenera glauco-viridia subglabra, petiolis angustis roseolis; lobi laterales utrinque 2–3 deltoidei integri summo acuto saepe retroverso; interlobiis 3–5 mm longis ca. 2 mm latis; lobus terminalis anguste elongato-hastatus ad 2 cm longus subobtusus vel subacutus, lobuli basales ca. 5 mm longi patentes.

Scapi arcuati tenuis floriferi folia superantes parce (sub involucre dense albo-) araneosi.

Involucrum 10 mm longum 8 mm latum basi rotundatum. Squamae exteriores adpressae ovatae 2,5–5 mm longae late pallide marginatae ciliolatae \pm erosae apice purpureae, omnes laeves.

Calathium ca. 2 cm diametro luteum; ligulae marginales planae extus stria rufo-purpurea vel -violacea notatae. Antherae polliniferae; stylus et stigmata mellea. Floret aestate.

Achenium (maturum ignotum) stramineum ca. 6 mm longum (pyramide inclusa) superne paulo spinulosum ceterum laeve, in pyramidem conico-cylindricam (spinulis saepe praeditam) 1,5 mm

longam sensim abiens. Rostrum ca. 4 mm longum; pappus albus 4-5 mm longus.

Typus: Baltistan: Ghondokoro Glacier, 4050 m, 14.7.1955, Nasir & Webster 6117 (h. RAW).

This species has large achenes ending in a very long pyramid. It is closely related to *T. baltistanicum* v. S., and has been collected in the same area; the flower heads are similar, though the ligulas of *T. melleum* have darker coloured stripes at the outside; the leaves are quite different, those of *T. melleum* e.g. being lobate and remarkably greyish green, and provided with less distinctly coloured petioles.

***Taraxacum stenolepium* v. Handel-Mazzetti 1907, c. icon.**

T. stenolepium, in its strict sense, is characterized as follows: lanceolate to nearby linear leaves, entire to remotely lobate; pink-coloured petioles; long and very narrow, \pm linear, two-coloured outer involucre bracts, blackish green with a distinct sharply defined white margin; dark stigmas (at least in dried condition); pale brown to straw-coloured achenes.

Two species have to be split off from *T. stenolepium*. One, occurring in Transcaucasia (*T. szovitsii* v. S.), probably does not belong to the section *Orientalia*; the other, *T. pseudo-stenolepium* v. S., has emarginate totally blackish outer bracts; it belongs to sect. *Tibetana* v. S.

Area: N. Afghanistan! and the outmost northwestern part of the Himalaya; Map II.

Localities:

Afghanistan: Griffith (h. K!, identified by HM), see also HM 1907.

Swat: Sho Nala, 3300 m, 22.8.1955, Rahman 35 (h. RAW); f. *humilis*.

Pakistan: Kagan valley, Saiful Maluk, 26.7.1954, Shaukat Ali 149 (h. RAW).

Baltistan: Thále La to Bagmaharál, northeast of Skárdo and Shigar, 30.8.1856, Schlagintweit 5963 (h. BM, M).

—: Deosai, 6.8.1955, Nasir & Webster 6378 (h. RAW).

Karakoram: 4350 m, 8.8.1876, Clarke 30196 C (h. BM!, K!, identified by HM), see also HM 1907.

—: Solu Glacier, Oblation valley, 3450 m, 26.8.1939, Scott Russell 1732 (h. BM).

—: Kero Lugma Glacier, 4350 m, 24.7.1939, Scott Russell 1258 (h. BM).

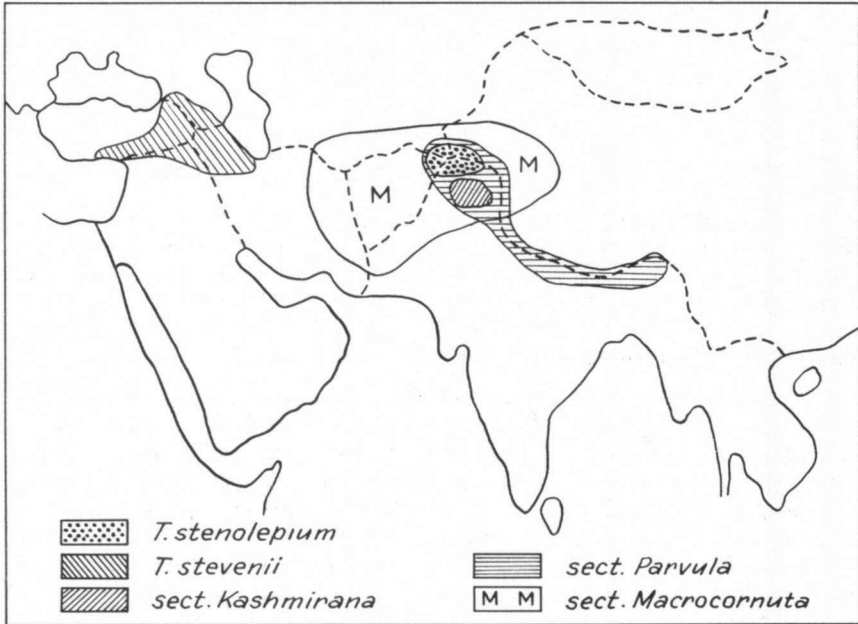
—: Makerum, Hispar Glacier, 3750 m, 1.8.1939, Scott Russell 1403 (h. BM); stigmas less dark than usual!

—: Hispar Glacier, moist area, 3900 m, 8.8.1939, Scott Russell 1543 (h. BM); yellow styles and stigmas!

—: Yengutsa Glacier, south of Hispar village, 3900 m, 23.8.1960, Polunin 6378 (h. BM).

Kashmir: Kamri Pass, 3600 m, 18.8.1939, Stewart (h. RAW 18711).

Plants whose stigmas are not-blackish, have twice been collected, both times in the Hispar area. The plants are, besides this, so much like the others, that I do not see enough reason to split this form off from *T. stenolepium* sens. str.; as, on the other hand, the colour of the stigmas generally is of specific importance in *Taraxacum*, a further investigation seems desirable to clear up their position.



Map II.

Taraxacum stevenii (Sprengel 1826) De Candolle 1838 em. v. Handel-Mazzetti 1907.

From a nomenclatural point of view there arise a few problems; the original *Leontodon alpinus* Steven 1813, renamed *L. Stevenii* Sprengel, is classed by DC within *Taraxacum* as *T. Stevenii*. In h. De Candolle (h. G), however, under this name no real *stevenii* is present; the material probably belongs to or is related to *T. stenolepium* HM. On the other hand, *T. crepidiforme* De Candolle 1838 seems to be identical with *Leontodon Stevenii*, according to the material in h. De Candolle; *T. integrifolium* C. Koch 1850 too is identical with it. It is uncertain whether *T. psychrophilum* Boissier 1849 too represents this species; the sample Boissier 7588 certainly is different (h. K).

T. stevenii is slightly variable; styles and stigmas are always blackish; if they show another colour, the material does not belong to this species. The outer involucre bracts are ovate or broadly lanceolate; the width of the white margin is variable but always sharply defined against the blackish central part.

According to HM, *T. stevenii* is mainly known from western Asia (Near East, Caucasus, Iran, Turkestan), seldom occurring more eastwards. I believe that the specimens collected in localities mentioned from central Asia and the Himalayan region do not belong to this species; as far as I have been able to study specimens from there they belonged to *T. baltistanicum*; however I have not studied some of the

specimens mentioned by HM 1907 and 1923, viz Nubra, Schlagintweit 2338; Ladakh and Kashmir, Meebold. The area from which I have seen specimens of *T. stevenii*, is given in map II.

***Taraxacum szovitsii* v. Soest spec. nov.**

Planta ca. 15 cm alta, basi araneosa fragmentis foliorum veteriorum vix conspicue incrassata.

Folia glabra pallide viridia exteriora \pm obovata, interiora lanceolata ad 10 cm longa (petiolo angusto pallido incluso) obtusa denticulata vel dentata.

Scapi ad 4, florendi tempore folia superantes, sub involucrio araneosi.

Involucrum mediocre basi paulo turbinatum, pallide viride 11 mm longum ca. 10 mm latum. Squamae exteriores lineares vel lanceolatae ad 2 mm latae ad 6 mm longae nunc sublatae et inconspicue pallide marginatae, nunc totae pallidae vel subroseolae nervo mediano atroviridi, minute atroviridi-corniculatae. Squamae interiores virides membranaceo-marginatae \pm callosae.

Calathium planum radians ad 3 cm diametro. Ligulae luteae marginales extus stria atro-violacea notatae; antherae polliniferae; styli et stigmata sordide lutea.

Achenium stramineum 4,5 mm longum (pyramide inclusa) superne parce et breviter spinulosum ceterum laeve, in pyramidem conicam 1 mm longam sensim abiens. Rostrum 6 mm longum; pappus pallide brunnescens 5 mm longus.

Typus: Karabagh, Szovits, ex herb. horti Petropolitani 633, pro *Leontodonte corniculato* (h. L.); the same material in h. G (h. DC) and h. M.

Furthermore:

Karabagh orient., in pratis altiorum montium, Fischer 1832, in h. DC as *T. stevenii*; Caucasia casp. subalp. pr. Kaschaen, Meyer 1832 as *T. corniculatum*, in h. DC. HM identified the specimens collected by Szovits and Fischer as *T. stenolepium*.

A specimen in h. K from Karabagh, collected by Szovits, has reddish achenes, but is otherwise not distinct from *T. szovitsii*; it must represent a form of this species (*f. rufulum* v. *S. form. nov.*).

It is not yet clear to me in which section this species belongs.

VI. SECT. MACROCORNUTA v. SOEST 1960

Map II shows the distribution of this section, which includes six species, viz. *T. aduncum* v. S., *T. afghanicum* v. S., *T. monochlamydeum* HM em. Hagl., *T. neolobulatum* v. S., *T. pullocarpum* v. S. and *T. wallichii* DC.

Of the six species mentioned above *T. wallichii* is the only one which is more or less common in the western part of the area considered here, whereas *T. aduncum* and *T. afghanicum* occur in Afghanistan only.

Several forms in the herbaria have not been named by me, mainly

owing to the insufficient state of the material. I have the impression that this section loses its characteristic features in the Himalayan region; not only because representative species like *T. monochlamydeum* and *T. neolobulatum* are scarce in that area, but also because other species, less characteristic for the section, occur there; of the latter only *T. pullocarpum* is described here.

***Taraxacum aduncum* v. Soest spec. nov.** (Fig. 2 f, g, h).

Planta mediocris gracilis ca. 8–12 cm alta basi araneosa.

Folia numerosa 6–10 cm longa tenera glauco-viridia (nervo mediano pallido) glabra oblanceolata obtusa integra saepe retroverso-denticulata, unguiculato-dentata vel breve lobata; lobi laterales 3–10 mm longi late unguiculati vel deltoidei apice retroversi, dorso et marginis parte inferiore dentati vel denticulati; petiolis angustis paulo roseolis.

Scapi tenues ca. 3, sub involucro glabri vel parcellissime araneosi.

Involucrum parvum subturbinatum sed basi rotundatum, ca. 10 mm longum pallide viride. Squamae exteriores apice recurvatae, lanceolatae vel anguste ovatae ad 3 mm longae anguste marginatae, apice roseolae callosae; squamae interiores apice corniculatae vel anguste cornutae.

Calathium planum radians 2–2,5 cm diametro flavum. Ligulae marginales extus stria atro-violacea ornatae. Antherae vacuae; stylus et stigmata subnigra. Floret vere.

Achenium parvum 2,5 mm longum (pyramide exclusa) pallide cupreum dense spinulosum, basin versus tuberculatum, in pyramidem cylindricam 0,3–0,4 mm longam abrupte abiens; rostrum 6 mm longum; pappus albus 5 mm longus.

Typus: N. Afghanistan: Doshi, 5.5.1938, Meinertzhagen (h. BM).

This species lacks pollen; it has blackish styles and stigmas. On the three sheets of the type collection it shows a rather wide variation in leaf form, whereas the other characters are remarkably constant.

***Taraxacum monochlamydeum* v. Handel-Mazzetti 1907 em. Hagl. 1938 p. 309–311; v. Soest 1960.**

Area: Turkestan!, Afghanistan!, Ladakh!, Mongolia; Kansu!, Sinkingiang!

Localities:

Ladakh: Dungti, along Sind river, 4300 m, 8.7.1931, Koelz 2364 (h. W).

—: Tankse, 4000 m, 30.7.1931, Koelz 2457 (h. W).

***Taraxacum neolobulatum* v. Soest 1960; *T. lobulatum* Bornmüller 1892, nomen nudum; Dahlstedt 1926, non Brenner 1907.**

Area: Iran!, Beluchistan!, Turkestan!; Kulu in the Himalaya!; localities are mentioned in v. S. l.c.

***Taraxacum pullocarpum* v. Soest spec. nov.**

Planta mediocris 5–8 cm alta, inferne araneoso-pilosa.

Folia 5–9 cm longa (petiolo purpureo incluso) laete gramineo-viridia (nervo mediano saepe brunneo) parcissime araneosa, lobata; lobi laterales (utrinque ad 4) triangulares vel hamati ad 1 cm longi saepe retroversi acuti, paulo dentati vel denticulati; interlobiis sat angustis interdum denticulatis et dentatis, pro minima parte atro-violaceis; lobus terminalis 1–2 cm longus interdum indeterminatus nam profunde incisus, plerumque subsagittatus vel paulo hastatus, subacutus, raro obtusus.

Scapi paulo araneosi vel subglabri, floriferi foliis aequilongi.

Involucrum ca. 13 mm longum, ca. 13 mm latum sat crassiusculum viride. Squamae exteriores ovatae vel late lanceolatae apice purpureae recurvatae inconspicue marginatae, callosae vel corniculatae; interiores cornutae.

Calathium planum radians ad 3 cm diametro luteum. Ligulae marginales extus stria cano-violacea notatae. Antherae polliniferae; stylus et stigmata livescentia. Floret vere.

Achenium rufo-brunneum 3,2 mm longum (pyramide exclusa) superne dense argute spinulosum ceterum rugosum, in pyramidem cylindricam 0,3 mm longam abrupte abiens; rostrum 9 mm longum; pappus albus ca. 6 mm longus.

Typus: Kashmir: East Liddar valley, above Pahalgam, 28.5.1959, Harbhajan Singh & v. S. 165 (h), 169 (h. LWG).

The horns on the involucrel bracts and the shape of the achenes indicate a position in sect. *Macrocornuta* for this species; from most representatives of this group it differs by the rather dark-coloured styles and stigmas. The leaf form is reminiscent of that of the lobated form of *T. tenebristylum* v. S. (sect. *Kashmirana* HM), but it is easily distinguishable by the section characters.

Taraxacum wallichii De Candolle 1838; v. Handel-Mazzetti 1907 (sens. lat.), c. icon.; v. Soest 1960.

Area: Iran!, Afghanistan!, Pakistan!, Kashmir!, N. W. India!

Localities:

Himalaya bor.-occ., reg. temp., 2100–3300 m, Thomson (h. K!, identified by HM).

Gilgit: Gulbar, 2400–3000 m, 1887, Giles 299 (h. K!, identified by HM).

Swat: near Mingora, 1.4.1956, Stewart (h. RAW!).

Chitral: Chitral-village, 1500 m, 11.4.1958, Stainton 2181 (h. BM, RAW).

Kashmir: Srinagar, road nearby Tourist Information Centre Office, 24.5.1959, H.B. Singh & v. S. 123 (h).

—: Srinagar, Shankracharja, 1740 m, 24.5.1959, H. B. Singh & v. S. 120 (h), 121 (h, h. DD, LWG, RAW, U); also 1800 m: 118 (h, h. BM, LWG), 119 (h).

—: Kokarnag, 1959, v. S. 143 c, d; grown from achenes collected there in Delft Bot. Garden (h) (slightly deviating see below).

—: Pahalgam, East Liddar valley, 28.5.1959, H. B. Singh & v. S. 163, 164 (h).

Pakistan: Rawalpindi-city, III–IV 1959, Riaz Ahmad (h. RAW).

—: Rawalpindi, Topi Park, 17.3.1940, Pimfold 5 (h. BM).

—: Hassan Abdal, 209 miles from Lahore, 24.1.'50, (h. DD).

—: Hussun (Hassan Abdal ?), 22.3.1872, Aitchison (h. DD).

—: Mansera, 1260 m, 11.4.1959, Stewart (h. RAW 28832).

Punjab: Patankot, 360 m, 8.3.1885, Nanak 1706 (h. K).

- : Jalba to Chengi, 1872, Aitchison 672 (h. K!), identified by HM).
 : Negrota, Kangra, 1800 m, Koelz 1728 (h. M!).
 : Atok, Falconer (h. K), identified as *T. indicum* by HM, see also HM 1907;
 I believe it may be an aberrant form of *T. wallichii*.
 Himachal Pradesh: Khaorala to Sungri, 1.7.1953, S.P. Settie (Raizada's collector)
 (h. DD 20152).

This species is rather variable, especially in leaf form. The petioles are pink; the stigmas are yellow; the achenes are small, with a short pyramid and a rather long rostrum. Achenes in immature stage (may?) have a pale orange colour. This species seems to flower during a very long part of the year (dependent of the locality?): January to September. According to Hou-Liu, the chromosome number of this species (plants from Kokarnag, v. S. 143 d) is diploid ($2n = 16$) but occasionally there are also triploid cells ($2n = 24$). The material from Kokarnag deviates slightly from typical *T. wallichii*.

VII. SECT. KASHMIRANA V. SOEST SECT. NOV.

Achenia rostrata, straminea, fulva, brunnea vel vulpina vel plerumque solum in statu immaturo fulva vel aurantiaca, in pyramidem longam cylindricam vel conico-cylindricam abrupte vel subabrupte abientia. Involucra nunc viridia, nunc rufo- vel purpureo-colorata, sicca non-atroviridia; squamae exteriores subadpressae vel apice recurvatae late marginatae, basi saepe latae vel semi-auriculatae. Calathia pallide vel subsaturate lutea. Planta montana subparva. Florendi tempore verno.

The normally early flowering time of the species belonging to this section was favourable for collecting purposes during my Kashmir tours. Most other collectors have visited the region in later periods of the year; thus material in most herbaria is scanty and not very representative.

The section occurs especially in Kashmir in its strict sense (Map II). Here most species grow in mass in grassfields at moderate altitudes, i.e. in the mountains up to 3000 m. Eastward of Kashmir, e.g. in Uttar- and Himachal-Pradesh this group may be present too, though in the herbaria specimens from there seem to be rare; they are either so badly collected or so badly prepared that identification seems impossible. In the Kulu valley, visited by me in spring 1959, I did not meet any species belonging to this section.

KEY TO THE SPECIES

(The shape of the leaves — an important character — is, for briefness' sake, not considered here, but it is advisable to compare the illustrations when using the key)

- | | |
|---|---|
| 1a. Achenes at or only just before maturity with a reddish hue (fulvous, orange, reddish brown), at maturity often only neutral-brown | 2 |
| b. Achenes at and before maturity light brown | 8 |

- 2a. Leaves blue-green, either washed with purple or with a metallic gloss; median nerve purple 3
 - b. Leaves grass-green or greyish; median nerve mostly green or pale 4
- 3a. Achenes red-brown, not very abruptly elongated into a conico-cylindrical pyramid *T. vulpinum*
 - b. Achenes before maturity more or less fulvous, at maturity reddish- or dark (neutral-) brown, abruptly elongated into a cylindrical pyramid *T. fulvo-brunneum*
- 4a. Achenes at maturity fulvous, dark-brown or reddish brown 5
 - b. Achenes at maturity light brown 6
- 5a. Achenes fulvous; pyramid conico-cylindrical. . *T. fulvescens*
 - b. Achenes reddish- to dark-brown; pyramid cylindrical *T. azzizi*
- 6a. Flowers distinct-pale yellow *T. flavum*
 - b. Flowers not distinct-pale yellow 7
- 7a. Petioles brown or purple; outer involucre bracts ovate *T. stereodiforme*
 - b. Petioles pale pink; outer involucre bracts lanceolate *T. pseudo-eriopodum*
- 8a. Pollen absent; outer involucre bracts ovate, purple, emarginate. *T. phœnicolepis*
 - b. Pollen present; outer involucre bracts marginate 9
- 9a. Stigmas pure (pale-) yellow *T. latibase*
 - b. Stigmas (more or less) greenish or dirty yellow 10
- 10a. Achenes (including pyramid) 5 mm long; petioles and, mostly the median nerve also, purple; side lobes very acute, numerous *T. gulmargense*
 - b. Achenes 4–4,5 mm long; petioles pale or pink 11
- 11a. Ligulas very short; flowers not wide open. *T. harbhajan-singhii*
 - b. Ligulas well developed; flowers radiating; compare also *T. harbhajan-singhii* ssp. *pahalgamense* 12
- 12a. Stigmas dirty yellow, blackish in dried condition; involucre 10 mm long and wide; outer bracts mostly lanceolate *T. tenebristylum*
 - b. Stigmas dirty yellow, not blackish in dried condition; involucre 15–20 mm long and wide; outer bracts mostly ovate with broad base *T. squarrosiceps*

Taraxacum azzizi v. Soest spec. nov. (Fig. 6)

Planta 12–20 cm alta, paulo araneosa.

Folia oblanceolata gramineo-viridia paulo canescentia, petiolis longis vel sublongis leviter roseolis. Folia exteriora subintegra retro-verso-dentata, interiora lobata, casu quo lobi laterales utrinque 3–4, 1–1,5 cm longi, triangulares dorso convexo interdum dentati et denticulati, margine in parte inferiore recto vel concavo, summo paulo retroverso; interlobiis ± latis interdum ± rufo-violaceis, paulo

dentatis vel e-dentatis; lobus terminalis indeterminato-hastatus vel elongato-deltaeus saepe incisus vel sublobulatus, obtusus vel subobtusus, lobuli basis retroversi.

Scapi graciles folia superantes, paulo (sub involucreo subdense) araneosi.

Involucrum ca. 15 mm longum ca. 15 mm latum basi rotundatum, viride. Squamae exteriores laxae adpressae denique apice \pm recurvatae, ovatae latissime albo-vel viridi-marginatae, apice purpureo-callosae vel laeves.

Calathium planum radians ad 3,5 cm diametro luteum; ligulae marginales planae extus stria cano-violacea notatae; antherae polliniferae; stylus sordide luteus, stigmata virescentia. Floret vere.

Achenium (immaturum fulvo-stramineum, denique aurantiacum) maturum rufum vel obscure brunneum, 5 mm longum (pyramide inclusa) superne squamulis tricuspидatis praeditum, ceterum tuberculatum, basi laeve, in pyramidem cylindricam 1,2 mm longam abrupte abiens; rostrum ca. 10 mm longum; pappus sordide albus ca. 6 mm longus.

Typus: Kashmir: Pahalgam, 2200 m, 27.5.1959, H. B. Singh & v. S. 148 b (h, h. LWG, U), also 154 (h). In the same region: E. Liddar valley, 2300–2500 m, 28.5.1959, H. B. Singh & v. S. 182 (h); W. Liddar valley, 29.5.1959, H. B. Singh & v. S. 187, 189, 191 (h).

Furthermore:

Kashmir: Banhyhal, 2250 m, 4.6.1959, H. B. Singh & v. S. 359 (h).

——: Gulmarg, 2700 m, 2.6.1959, H. B. Singh & v. S. 240 (h, h. DD), 250 (h) and 3.6.1959, H. B. Singh & v. S. 294 (h, h. RAW).

——: Gulmarg to Ninghi Nallah, 2800 m, 5.6.1959, H. B. Singh & v. S. 324, 325, 326 (h).

——: westward of Gulmarg, 2700 m, 5.6.1959, H. B. Singh & v. S. 317 (h). Pakistan: Murree, Patriata, 17.5.1944, Tagdamba 21 (h. DD).

Taraxacum flavum v. Soest **spec. nov.** (Fig. 7).

Planta tenera parva ad 12 cm alta basi fragmentis foliorum veteriorum paulo incrassata, inferne araneoso-pilosa.

Folia ad 8 cm longa (petiolo angusto pallide roseolo vel purpureo incluso) subcrassa \pm cano-viridia subtus araneosa, lanceolata retroverso-dentata vel denticulata vel lobata; lobi laterales breviter triangulares acuti ad 6 mm longi saepe apice recurvati, subintegri; interlobiis brevis latis paulo denticulatis; lobus terminalis deltaeus hastatus, interdum paulo breviter dentatus vel denticulatus, subacutus, lobuli basales acuti patentes.

Scapi rufo-purpurei, foliis aequilongi vel ea breviter superantes araneosi, sub involucreo densissime araneosi.

Involucrum parvum ca. 10 mm longum 6–7 mm latum pallide viride. Squamae exteriores laxae adpressae apice subrecurvatae, ca. 6 mm longae lanceolatae late albido-marginatae, apice roseolae vel purpureae, pro parte minute callosae. Squamae interiores apice purpureae minute callosae.

Calathium planum radians ad 23 mm diametro, pallide luteum.

Ligulae marginales planae extus stria pallide griseo-violacea notatae. Antherae polliniferae; stylus luteus, stigmata paulo virescentia. Floret junio.

Achenium dilute brunneum (immaturum fulvum) 3 mm longum (pyramide exclusa) superne argute spinulosum ceterum rugosum, basi laeve, in pyramidem cylindricam 1-1,2 mm longam subabrupte abiens; rostrum 5 mm longum; pappus albus 5 mm longus.

Typus: Kashmir: Gulmarg, 2700 m, in grassy fields, 4.6.1959, v. S. 303 (h, h. BM), 304 (h), 306 (h, h. LWG), 308 (h. DD). Also: 1.6.1959, v. S. 218 (h, h. K), 223 (h, h. RAW, U).; 3.6.1959, v. S. 302 (h); 2.6.1959, H. B. Singh & v. S. 245 b (h), 247 (h, h. IARI).

Furthermore:

Kashmir: westward of Gulmarg, 2700 m, 5.6.1959, H. B. Singh & v. S. 314 (h).

—: between Gulmarg and Tangmarg, 2500 m, 6.6.1959, H. B. Singh & v. S. 337; also 332 h, grown from achenes (c. 80) in Delft Botanical Garden (h, h. BLAT).

—: Banhyhal, 2700 m, 9.6.1959, H. B. Singh & v. S. 346 (h).

Taraxacum fulvescens* v. *Soest spec. nov. (Fig. 3aa).

Planta sat robusta 10-15 cm alta.

Folia numerosa cano-viridia paulo araneosa 10-20 cm longa, petiolo subalato rufescente incluso. Folia exteriora lanceolata vel lingulata subintegra retroverso-dentata et -denticulata, subobtusata. Folia interiora lobata; lobi laterales utrinque ca. 4, falcato-vel reflexo-triangulares acuti submucronulati, dorso integro vel \pm minute dentato, margine in parte inferiore integro; interlobiis sat latis (6-10 mm) ad 2 cm longis, angulis loborum plicatulis; lobus terminalis

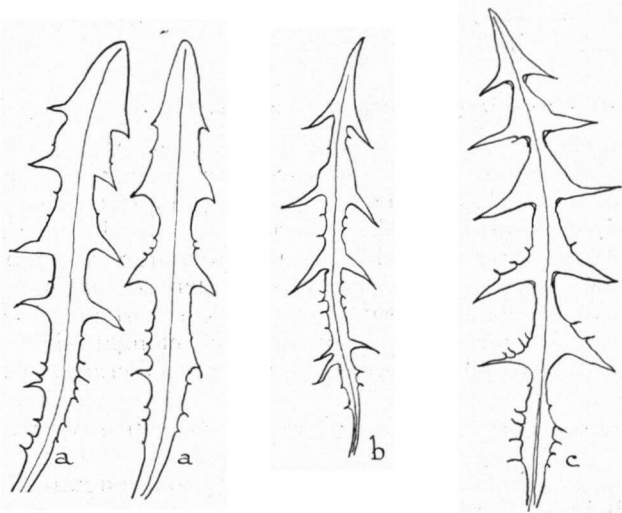


Fig. 3. a, a: *T. fulvescens*; b: *T. squarrosiceps*; c: *T. stereodiforme*

sagittatus vel elongato-deltaeideus, lobulo apicali saepe elongato vel subacuto integro.

Scapi araneosi floriferi foliis breviores vel sub-aequilongi.

Involucrum 12–15 mm longum ca. 15–17 mm latum crassiusculum glauco-viride. Squamae exteriores adpressae apice pro parte recurvatae, ad 7–8 mm longae ovatae vel ovato-lanceolatae ad 3 mm latae sublatae vel late albo- vel viridi-marginatae, nervo mediano obscuro, omnes apice atro-violaceae laeves vel minute callosae.

Calathium planum radians ad 25 mm diametro luteum. Ligulae marginales planae extus stria cano-violacea notatae. Antherae polliniferae; stylus cano-lutescens, stigmata livescentia siccis subnigra. Floret maio-junio.

Achenium sordide fulvum 4–5 mm longum (pyramide inclusa) superne squamulis pro rata magnis (ad 0,5 mm longis) praeditis ceterum tuberculatum, in pyramidem conico-cylindricam latam 1 mm longam abrupte abiens. Rostrum 7–8 mm longum; pappus albus 6–7 mm longus.

Typus: Kashmir: Pahalgam, Liddar valley, 27.5.1959, H. B. Singh & v. S. 144 (h, h. BM, DD, K, LWG, RAW, U).

Furthermore:

Kashmir: West Liddar valley, above Pahalgam, 28.5.1959, H. B. Singh & v. S. 185 c (h).

——: East Liddar valley, 8 m. from Pahalgam, 28.5.1959, H. B. Singh & v. S. 172 b (h).

——: Banhyhal, 2300 m, 9.6.1959, H. B. Singh & v. S. 348 (h), 356 (h, h. LWG), 357 (h).

Gilgit: Nattar valley, north of Gilgit, 3000–3300 m, 4.8.1892, Duthie (h. DD); in HM 1907 this locality (as "Nittar") is mentioned for h. B as *T. stenolepium*.

This species resembles *T. aereum* v. S. and *T. banhyhalense* v. S., but the achenes are abruptly elongated into the pyramid; see below under *T. aereum* (sect. *Parvula*).

Taraxacum fulvo-brunneum v. Soest *spec. nov.* (Fig. 8).

Planta mediocris ca. 10 cm alta inferne araneosa.

Folia decumbentia intense prasino-viridia saepe purpurescentia parce araneosa subcrassa nervo mediano rufo-purpurea, petiolis pallidis vel rufescentibus. Folia exteriora oblanceolata dentata vel breviter lobata; interiora valde lobata (utrinque 3–4 loba); lobi laterales triangulares acuti dorso modice dentati in interlobiis ± abeuntibus, margine in parte inferiore saepe convexo, angulis loborum rotundatis; lobus terminalis sagittatus vel elongato-deltaeideus edentatus subacutus ad subobtusum interdum mucronulatus; lobuli basales acuti.

Scapi cuprei floriferi foliis subaequilongi sub involucri paulo araneosi.

Involucrum mediocre crassiusculum ca. 12 mm longum ca. 12 mm latum, subobscurum viride glaucescens. Squamae exteriores laxae adpressae apice patentes vel paulo recurvatae, ovatae vel late lanceo-

latae acuminatae ad 8 mm longae late albo- vel viridi-marginatae, omnes parce purpureae.

Calathium planum radians ad 3 cm diametro, clare luteum; ligulae marginales planae extus stria cano-violacea (denique \pm purpurea) ornatae. Antherae polliniferae; stylus virescens, stigmata \pm fusco-virescentia Floret vere.

Achenium 5 mm longum (pyramide inclusa) immaturum griseofulvum, denique rufum ad obscure brunneum, superne spinulosum ceterum tuberculatum, in pyramidem (ad 1,3 mm) longam cylindricam spinulis saepe praeditam abrupte abiens. Rostrum ca. 7 mm; pappus niveus ca. 6 mm longus.

Typus: Kashmir: Verinag, near Resthouse, 1800 m, 9.6.1959, v. S. 343 a; grown from achenes in Delft Botanical Garden (c. 58, 59, 64); 343 b, also grown at Delft (c. 110, 124, 125, 126) in h. v. S.

Furthermore:

Kashmir: Kokarnag, 26.5.1959, H. B. Singh & v. S. 143 e; grown in Delft Botanical Garden (c. 117-120), in h and h. IARI, LWG).

—: Gulmarg to Tangmarg, 2550 m, 6.6.1959, H. B. Singh & v. S. 332 d; grown from achenes in Delft Botanical Garden (c. 39-44) in h and h. LWG, U.

—: above Tangmarg, 2100 m, 10.5.1935, Malindar Nath 903 (h. RAW).

—: Tangmarg, 2100 m, 6.6.1959, H. B. Singh & v. S. 335 d; grown from achenes in Delft Botanical Garden (c. 47) in h. and h. DD.

According to Hou-Liu (8), the chromosome number of this species (Gulmarg-Tangmarg, 332 d) is $2n = 16$, which means that it is diploid.

Taraxacum gulmargense v. Soest *spec. nov.* (Fig. 9).

Planta parva ca. 8 cm alta inferne dense araneoso-pilosa.

Folia decumbentia apice suberecta, facile plicantia, subobscura viridia vel griseo-viridia ad 10 cm longa, araneoso-pilosa, petiolis nervoque medio praesertim parte inferiore vinoso-coloratis. Folia exteriora lanceolata sublobata vel integra retroverso-dentata et denticulata, acuta. Folia interiora inciso-lobata; lobi laterales ad 1 cm longi subfalcati retroversi acutissimi dorso curvato-dentati et denticulati; interlobiis saepe indeterminatis sublatis dentatis vel sublobulatis; lobus terminalis indeterminatus ad 2,5 cm longus anguste hastatus inciso-dentatus et denticulatus pro parte longe (ad 2 mm) mucronatus.

Scapi cuprei ad purpurei curvati dense (sub involucreo densissime) araneosi, floriferi foliis breviores.

Involucrum ca. 12 mm longum ca. 10 mm latum rufescenti-viride. Squamae exteriores valde recurvatae subtortae lineari-lanceolatae ad 1,5 mm latae ad 9 mm longae dorso rufo-purpurascens, anguste (0,1 mm) albo-marginatae apice laeves. Squamae interiores sordide virides apice violaceae minute callosae.

Calathium paulo radians 1-2 cm diametro saturate luteum. Ligulae marginales planae extus stria rufo-purpurea notatae interdum subestriatae. Antherae polliniferae; stylus luteus, stigmata subvirescenti-lutea. Floret maio et junio.

Achenium dilute brunneum 5 mm longum (pyramide inclusa) superne breve spinulosum ceterum rugosum—basi laeve, in pyramidem conico-cylindricam 1 mm longam subabrupte abiens. Rostrum 10 mm longum; pappus albus 7 mm longus.

Typus: Kashmir: Gulmarg, grassy fields, 2700 m, 4.6.1959, v. S. 295, 301, 310 (h). Furthermore: Gulmarg, 2600 m, 1.6.1959, v. S. 206 (h), 207 (h, h. LWG), 211 (h); 2650 m, 1.6.1959, v. S. 198 (h); 2700 m, 2.6.1959, H. B. Singh & v. S. 291 a (h); 2850 m, 3.6.1959, H. B. Singh & v. S. 292 (h).

Furthermore:

- Kashmir: between Gulmarg and Tangmarg 1959, H. B. Singh & v. S. 332 b, grown from achenes in Delft Botanical Garden (c. 60, 89, 90, 108) in h, h. DD, LWG, RAW).
 —: Tangmarg 1959, H. B. Singh & v. S. 335 b, grown from achenes in Delft Botanical Garden (c. 46, 53–56) in h., h. LWG, U.
 —: Verinag 1959, H. B. Singh & v. S. 390, grown from achenes in Delft Botanical Garden (c. 6–7, 81–86, 93) in h, h. BLAT, BM, DD, IARI, K, LWG, MH, RAW, U.
 —: Pahalgam, west of Liddar, 2100 m, 13.9.1960, Heybroek 34 (h. v. S.), "status autumnalis".
 —: Kashmir-tour, X 1953, Kaul et al. (h. LWG 33882).

In cultivation the pale brownish-purple colour of the outer involucre bracts is lost. In rich soil the plants of course reach a greater height and the flower heads become larger. *T. gulmargense* seems to be related to *T. vulpinum* but it has redbrown achenes and bluish green leaves washed with purple.

***Taraxacum harbhajan-singhii* v. Soest spec. nov.** (Fig. 10):

Planta parva ca. 5 cm alta basi fragmentis foliorum veteriorum paulo incrassata.

Folia cano-viridia subcrassa subglabra ca. 5 cm longa petiolo angusto vel subangusto pallide viridi vel parum roseolo incluso, lobata; lobi laterales ± deltoidei vel triangulares ± minute dentati summo acuto patente vel paulo retroverso; interlobiis indeterminatis, subdentatis; lobus terminalis deltoideus vel subhastatus subobtusus vel subacutus paulo dentatus.

Scapi 1–2, floriferi foliis subaequilongi arcuati, saepe modice araneosi.

Involucrum parvum gracile 10 mm longum 7–8 mm latum pallide viride, Squamae laeves, exteriores lanceolatae laxae adpressae apice recurvatae, marginatae apice purpureae.

Calathium subclausum vel paulo apertum, ad 1,2 cm diametro; ligulae breves luteae, marginales angustae vel pro parte involutae, extus aurantiacae vel purpureae. Antherae polliniferae; stylus luteus, stigmata paulo virescentia. Floret aestate.

Achenium parvum 4 mm longum (pyramide inclusa) dilute brunneum superne dense sublacte spinulosum ceterum rugosum, in pyramidem subcylindricam 1 mm longam subsensim abiens. Rostrum ca. 6 mm longum; pappus albus ca. 5 mm longus.

Typus: Kashmir: Gulmarg, 2600 m, 1.6.1959, v. S. (h, h. LWG), also 203 (h, h. BM, U), 222 (h, h. RAW), 226 a (h. DD). In the same region at 2700 m, 2.6.1959, H. B. Singh & v. S. 229 (h) and 4.6.1959, v. S. 296 (h), 309 (h, h. IARI, K); 2760 m, 3.6.1959, H. B. Singh & v. S. 293 (h).

In other parts of Kashmir related forms have been collected. Especially in the Liddar valley a form occurs that at first view does not look like a near ally of *T. harbhajan-singhii*, and that I first considered to be a different species (*T. pahalgamense*). However, a closer examination showed that the latter may pass into forms which are scarcely distinguishable from *T. harbhajan-singhii*. Moreover, in other parts of Kashmir so far only intermediate forms have been collected. Though the typical *T. harbhajan-singhii* and the typical *T. pahalgamense* differ considerably (see below), I like to consider both to be sp. of one species, of which the first is chosen as the typical one.

In *Taraxacum* a variability so wide as is found here, is a rare phenomenon and probably only to be expected where normal cross-fertilization takes place, which, as far as known, is found only in the genus in diploid forms. It is a pity, therefore, that these forms failed to grow in my garden, so that the chromosome number could not be determined.

ssp. **pahalgamense** v. Soest **subspec. nov.** (fig. 11).

Planta gracilis 5–10 cm alta basi fragmentis foliorum veteriorum incrassata, inferne araneoso-pilosa.

Folia canescenti- vel subglauco-viridia glabra lobata, petiolis pallidis vel roseis; lobi laterales utrinque ca. 3, triangulares acuti ad 12 mm longi dorso recto vel concavo raro dentato abiente in interlobos longos minute dentatos, margine in parte inferiore convexo et interdum denticulato; lobus terminalis elongato-sagittatus ad 2,5 cm longus integer subobtusus, lobuli basales ad 1 cm longi.

Scapi paulo araneosi floriferi foliis aequilongi.

Involucrum mediocre ca. 12 mm longum 12–14 mm latum subobscure viride purpurascens. Squamae exteriores laxe adpressae apice recurvatae ad 7 mm longae, ovatae vel late lanceolatae sublate albo-vel viridi-marginatae, interiores callosae vel laeves.

Calathium paulo radians ad 18 mm diametro luteum. Ligulae marginales planae extus stria cano-purpurea vel cano-violacea notatae. Antherae polliniferae; stylus et stigmata sublutea. Floret vere.

Achenium obscure brunneum, immaturum rufo-griseum, 4,2 mm longum (pyramide inclusa) superne spinulosum ceterum rugosum, basi laeve, in pyramidem cylindricam 1,2 mm longam subabrupte abiens. Rostrum 5–6 mm longum; pappus albus 5 mm longus.

Typus: Kashmir: Pahalgam, 2200 m, 27.5.1959, H. B. Singh & v. S. 159 (h); also 145 (h, h. LWG, U), 160 (h, h. DD), 161 (h, h. BM).

Furthermore, in the same region: road from Pahalgam to Mattan, 1950 m, 16.9.1960, Heybroek 70 (h. v. S.); W. Liddar valley above Pahalgam, 29.5.1959,

H. B. Singh & v. S. 186 (h); E. Liddar valley, 2100–2400 m, 28.5.1959, H. B. Singh & v. S. 171, 181 (h); also a form with distinct small horns on the inner involucre bracts viz. 172 a (h).

The intermediate forms in no way constitute a homogeneous group; they combine certain characteristics of both subspecies.

- Kashmir: Pahalgam, 2200 m, 27.5.1959, H. B. Singh & v. S. 146 (h), a form with short ligulas, otherwise resembling ssp. *pahalgamense*.
 —: W. Liddar valley above Pahalgam, 29.5.1959, H. B. Singh & v. S. 185 b (h), the same remark.
 —: E. Liddar valley, 2100–2400 m, 28.5.1959, H. B. Singh & v. S. 168 (h).
 —: Pahalgam, Batakut valley 1970 m, 19.6.1960, Heybroek 69, pro parte (h. v. S.); "called HEND in Kashmir and Pahari; the whole plant is boiled and used against colds".
 —: Verinag, 1800 m, 9.6.1959, v. S. 342 (h).
 —: Verinag, sunny spot in the forest, 1920 m, 10.6.1959, H. B. Singh & v. S. 383 (h).
 —: above Shahabad, 1850 m, 10.6.1959, H. B. Singh & v. S. 386 (h).
 —: Banhyhal, 2250 m, 9.6.1959, H. B. Singh & v. S. 361 (h); also 2300 m, 354 (h).

As can be seen from the descriptions of the two subspecies, they differ mainly by the following characters:

| | <i>harbhajan-singhii</i> | <i>pahalgamense</i> |
|-----------------|--------------------------|-------------------------|
| terminal lobe | deltoid, short | sagittate, long |
| involucre | pale green, small | darker green, larger |
| external bracts | lanceolate | ovate |
| internal bracts | without gibbosities | mostly with gibbosities |
| ligulas | short | longer |
| achenes | light brown | darker brown |

Taraxacum latibase v. Soest spec. nov.

Planta mediocris 12–20 cm alta basi araneosa.

Folia numerosa glabra griseo- vel cyaneo-viridia ad 10 cm longa, petiolo roseolo vel pallido subalato vel angusto incluso. Folia exteriora oblanceolata remote retroverso-dentata obtusa, petiolis sublongis. Folia interiora breviter lobata vel grosse dentata; lobi laterales patentas deltoidei ad 7 mm longi paulo acuminati subacuti integri; interlobiis inconspicue evolutis ca. 10 mm latis; lobus terminalis indeterminatus subdeltoideus subobtusus ad acutus interdum subdentatus.

Scapi subglabri, floriferi folia saepe superantes, interdum bracteis parvis muniti.

Involucrum crassiusculum viride. Squamae exteriores numerosae laxae adpressae apice ± recurvatae asymetrico-ovatae basi subauriculatae, acuminatae ad 7 mm longae late albo- vel viridi-marginatae apice roseolae, omnes laeves.

Calathium 2–3 cm diametro luteum. Ligulae marginales planae extus extriatae vel stria pallide cano-violacea vel cano-purpurea vix conspicue notatae. Antherae polliniferae; stylus et stigmata laete lutea. Floret aestate.

Achenium maturum ignotum, rostratum; pappus albus.

Typus: Kashmir: Gulmarg, 2700 m, 2.6.1959, H. B. Singh & v. S. 249 (h, h. LWG); also 235, 256 (h).

Furthermore: in the same region: between Gulmarg and Khellanmarg, 2700 m, 3.6.1959, H. B. Singh & v. S. 266 (h); between Gulmarg and Ninghi Nallah, 2800 m, 5.6.1959, H. B. Singh & v. S. 328 (h); westward of Gulmarg, 2700 m, 5.6.1959, H. B. Singh & v. S. 313 (h, h. U); the same 318 (h) with slightly dirty yellow stigmas.

Taraxacum phoenicolepis v. Soest *spec. nov.* (Fig. 12).

Planta mediocris 10–12 cm alta basi fragmentis foliorum veteriorum paulo incrassata, inferne longe araneoso-pilosa.

Folia numerosa gramineo-viridia paulo canescentia subaraneosa lobata, petiolo (nervoque mediano in parte inferiore) roscolo vel rufescente; lobi laterales utrinque ca. 4–5 patentes vel subretroversi anguste triangulares vel subfalcati interdum sublineares dorso dentato, margine inferiore interdum 1 dente munito, angulis loborum subplicatis fusco-marginatis; interlobiis ad 1,5 cm longis angustis fortiter longe dentatis et denticulatis; lobus terminalis sagittatus ad 2 cm longus interdum dentatus vel incisus, lobuli basales acuti ad 12 mm longi; lobulis apicalis lingulatus subobtusus mucronulatus.

Scapi floriferi foliis aequilongi sub involucro dense araneosi.

Involucrum crassiusculum 12 mm longum 14 mm latum. Squamae exteriores recurvatae ovatae ad 7 mm longae, inconspicue marginatae purpureae, interiores late lineares virides membranaceo-marginatae.

Calathium paulo radians ad 2 cm diametro obscure luteum; ligulae marginales ± planae extus stria atro-purpurea ornatae. Antherae vacuae; stylus et stigmata fusco-virescentia. Floret maio.

Achenium dilute brunneum 4 mm longum (pyramide inclusa) superne spinulosum ceterum rugosum, basi laeve, in pyramidem cylindricam 1 mm longam abrupte abiens; rostrum 6–7 mm longum; pappus sordide albus 5 mm longus.

Typus: Kashmir: Shalimar, garden of the Agronomical Research Institute, 25.5.1959, H. B. Singh & v. S. 140 (h); grown from achenes in Delft Botanical Garden (c. 111, 129) in h, h. U. Also from the same place 137 a (c. 12, 105) in h, h. LWG.

At first view this species resembles species of sect. *Vulgaria* Dahlst., but a closer examination of the achenes with their long cylindrical pyramid proves that it can not belong to it, but probably to sect. *Kashmirana* v. S., though it deviates in some minor points. Especially the emarginate outer involucreal bracts are remarkable. *T. phoenicolepis* is easily recognizable by the purple colour of the outer bracts, the dark yellow ligulas with dark red stripes at the outside, and by the lack of pollen.

Taraxacum pseudo-eriopodium v. Soest *spec. nov.* (Fig. 13).

Planta humilis ad 8 cm alta.

Folia numerosa subdecumbentia subcrassa cano-iridia lingulata,

lobata subglabra, petiolis alatis paulo roseis; lobi laterales (utrinque ca. 3) breves ca. 6 mm longi triangulares vel pro parte deltoidei, subacuti vel acuti, dorso paulo denticulati; interlobiis sublatis; lobus terminalis deltoideus subobtusus interdum elongatus (ad 1,5 cm longus).

Scapi floriferi foliis breviores, araneosi, sub involucre dense vel densissime araneosi.

Involucrum crassiusculum mediocre 10–12 mm longum 15 mm latum \pm rufo-viride. Squamae exteriores lineares vel lanceolatae 1–1,3 mm latae reflexo-patentes albo-marginatae nervo mediano subobscuri viridi, summo ciliolato purpureo, raro minutissime atro-callosae; squamae interiores exterioribus aequilatae.

Calathium paulo radians ad 2 cm diametro luteum. Ligulae marginales angustae planae extus stria purpurea vel rufo-purpurea ornatae. Antherae polliniferae; stylus et stigmata sordide lutea. Floret aestate.

Achenium dilute brunneum (immaturum fulvescens) 3,5 mm longum (pyramide exclusa) angustum superne squamulis praeditum ceterum rugosum, basi laeve, in pyramidem conico-cylindricam 1–1,2 mm longam (spinulis saepe praeditam) subsensim abiens. Rostrum 5 mm longum; pappus albus 5 mm longus.

Typus: Kashmir: Gulmarg, 2650 m, 1.6.1959, v. S. 196 (h, h. U), 197 (h, h. LWG); co-typus fructifer: Gulmarg, 2700 m, 4.6.1959, v. S. 297 (h).

Furthermore in the same region: Gulmarg, 2600 m, 1.6.1959, v. S. 210, 227 (h); 2700 m, 2.6.1959, H. B. Singh & v. S. 232 (h), 241 (h, h. DD); westward of Gulmarg, 2700 m, 5.6.1959, H. B. Singh & v. S. 316, 320 (h); above Gulmarg, 2850 m, 3.6.1959, H. B. Singh & v. S. 290 (h); between Gulmarg and Khellanmarg, 2850–3000 m, 3.6. 1959, H. B. Singh & v. S. 269 (h, h. DD, LWG), 288 and 291 b (h); Khellanmarg, 3200 m, 3.6.1959, H. B. Singh & v. S. 281 (h, h. IARI); between Gulmarg and Ninghi Nallah, 2800 m, 5.6.1959, H. B. Singh & v. S. 323 (h).

Taraxacum squarrosiceps v. Soest *spec. nov.* (Fig. 3b).

Planta 10–15 cm alta; collum radice araneosum.

Folia parce araneosa canescenti-viridia nervo mediano pallido. Folia exteriora lanceolata retroverso-dentata vel breviter sublobata, subobtusata mucronulata; interiora lobata, lobi laterales (utrinque ca. 3) anguste triangulares ad 1 cm longi retroversi subintegri acuti saepe mucronulati, interlobiis 3–5 mm latis 5–10 mm longis saepe denticulatis vel argute dentatis; lobus terminalis elongato-sagittatus acutus vel subacutus, lobuli basales ad 6 mm longi patentes; petiolis subroseis.

Scapi 1–3 subcrassi floriferi foliis subaequilongi, araneosi, sub involucre dense araneosi.

Involucrum crassiusculum 15 mm longum ad 20 mm latum. Squamae exteriores laxe adpressae apice saepe recurvatae, ovatae saepe valde elongatae 7–9 mm longae 3 mm latae atro-purpurascens, basi subauriculatae, late albo-marginatae apicem versus anguste marginatae, saepe erosae, pro parte minute callosae; squamae interiores virides apice atro-purpureae pro parte minute callosae.

Calathium paulo radians ad 2,5 cm diametro subobscure luteum. Ligulae marginales planae extus stria rufo-purpurea notatae. Antherae polliniferae; stylus et stigmata sordide virescentia. Floret junio.

Achenium (maturum ignotum) dilute brunneum (?) rostratum; pappus albus.

Typus: Kashmir: Gulmarg, 2600 m, 1.6.1959, v. S. 201 (h. LWG), 205 (h); also 2700 m, 4.6.1959, v. S. 298 (h. U), 299 (h); between Gulmarg and Ninghi Nallah, 2800 m, 5.6.1959, H. B. Singh & v. S. 322, 327 (h, h. DD).

As in most species of the section, the outer involuclral bracts of *T. squarrosiceps* have a subauriculate or at least a broad base; the margin of these bracts is wide, but it narrows towards the apex. It is closely related to *T. tenebristylum* v. S., from which it differs by less araneous leaves with pale petioles, larger involuclres with the outer bracts broader at the base and narrowly elongated into a purple and recurved apex, a more distinct reddish colour at the outside of the ligulas, and less dark styles and stigmas, at least in dried specimens.

***Taraxacum stereodiforme* v. Soest spec. nov.** (Fig. 3c).

Planta ca. 10 cm alta.

Folia decumbentia ad 12 cm longa (petiolo rufescente purpureo incluso) gramineo-viridia dorso (in nervo dorsali dense) araneoso, lobata; lobi laterales utrinque ca. 5 approximati triangulares vel subfalcati ad 1,5 cm longi peracuti \pm patentes dorso concavo, lobi inferiores valde dentati, ceteri subintegri, margine in parte inferiore integro vel 1 dente recurvato minuto instructo; interlobiis fusco-marginatis dentatis vel denticulatis, angulis loborum plicatis; lobus terminalis sagittatus vel interdum incisus vel longe dentatus, lobuli basales 0,5–1,5 cm longi patentes vel retroversi.

Scapi floriferi foliis breviores, sub involuclro dense araneosi.

Involuclrum mediocre 13–14 mm longum 16 mm latum crassiusculum rufo-viride. Squamae exteriores laxae adpressae apice paulo recurvatae, ovatae ad 10 mm longae 2–3 mm latae late viridi-marginatae, omnes apice purpureae laeves.

Calathium planum radians 3 cm diametro saturate luteum. Ligulae marginales planae extus stria rufo-purpurea ornatae. Antherae polliniferae; stylus et stigmata virescentia. Floret vere.

Achenium in statu submaturo pallide aurantiacum vel aureo-ochraceum, in statu maturo dilute brunneum, 4 mm longum (pyramide inclusa) superne breviter spinulosum ceterum rugosum, basi laeve, in pyramidem conico-cylindricam 0,8 mm longam subabrupte abiens; rostrum 7 mm longum; pappus albus 6 mm longus.

Typus: Kashmir: between Gulmarg and Tangmarg, 2550 m, achenes collected 6.6.1959, H. B. Singh & v. S. 332 a; grown in Delft Botanical Garden (c. 95), in h, h. LWG.

The description, being made after cultivated plants, may not completely cover the plants growing under natural conditions. The following specimens nevertheless seem to belong to this species.

Kashmir: westward of Gulmarg, 2700 m, 5.6.1959, H. B. Singh & v. S. 319 (h).
 —: between Gulmarg and Khellanmarg 2700 m, 3.6.1959, H. B. Singh & v. S. 267 (h).
 —: Banhyhal, 2700 m, 9.6.1959, H. B. Singh 347 (h. v. S.).

The leaf form of this species is similar to that of *T. stereodes* Ekm. (sect. *Vulgaria* Dahlst.) from Europe, but the characters of the achene and of the involucre indicate that this species belongs to sect. *Kashmirana*. It seems closely related to *T. squarrosiceps*.

Taraxacum tenebristylum v. Soest **spec. nov.** (Fig. 14).

Planta 6–12 cm alta; collum radices longe araneosum.

Folia suberecta canescentia, parce, in nervo dorsali subdense araneosa, petiolis angustis roseis. Folia exteriora lanceolata ad 1,5 cm lata retroverso-denticulata vel -dentata, interdum magis dentata, subobtusata. Folia interiora utrinseque ca. 3 loba; lobi laterales triangulares ad 1 cm longi acuti dorso saepe convexo plerumque integro, margine in parte inferiore saepe concavo; interlobiis saepe argute retroverso-dentatis vel denticulatis; lobus terminalis elongato-deltoides vel subhamatus vel subsagittatus interdum inciso-dentatus, subacutus vel subobtusus, lobuli basales acuti ± retroversi.

Scapi 1–2 floriferi foliis subaequilongis, araneosis, sub involucre subdense araneosi.

Involucrum mediocre 10 mm longum, 10–12 mm latum. Squamae exteriores recurvatae lanceolatae vel anguste ovatae, ad 7 mm longae 2–2,5 mm latae inconspicue anguste vel sublatae marginatae purpurascens, omnes apice atro-purpureae, pro minima parte minute callosae.

Calathium planum paulo radians ad 2,5 cm diametro luteum. Ligulae marginales planae extus stria rufo-purpurea notatae. Antherae polliniferae; stylus et stigmata fusco-lutea, siccitate subnigra. Floret vere.

Achenium (maturum ignotum) dilute brunneum ca. 4 mm longum (pyramide inclusa) superne spinulosum ceterum rugosum, basi laeve, in pyramidem conicam brevem (0,4 mm longam?) subabrupte abiens. Rostrum ca. 6 mm longum; pappus sordide albus 6 mm longus.

Typus: Kashmir: Gulmarg, 2700 m, 4.6.1959, v. S. 307 (h); also in the same region: 2700 m, 2.6.1959, H. B. Singh & v. S. 236 (h, h. LWG, U), 237, 251, 257, 263 (h); 4.6.1959, v. S. 300 (h, h. RAW); 2650 m, 1.6.1959, v. S. 195 (h); 2600 m, 1.6.1959, v. S. 199 a, 202, 217 (h), 217 b (h, h. BM), 221 (h, h. DD); Gulmarg to Ninghi Nallah, 2700 m, 5.6.1959, H. B. Singh & v. S. 321 (h) and 2800 m, 329 (h); Gulmarg to Khellanmarg, 2700 m, 3.6.1959, H. B. Singh & v. S. 268 (h, h. IARI); Khellanmarg, 3000 m, 3.6.1959, H. B. Singh & v. S. 270 (h).

Furthermore:

Kashmir: Sonamarg, 3000 m, 27.7.1928, Stewart 9799 (h. K).

The short pyramid (on not fully ripe achenes!) is an unusual feature in sect. *Kashmirana*. This species nevertheless seems to belong to it, as it is closely allied to a number of species which indubitably belong to this section.

***Taraxacum vulpinum* v. *Soest spec. nov.* (Fig. 15).**

Planta 10–20 cm alta.

Folia numerosa suberecta prasino-viridia saepe purpurascencia, glabra vel in nervo mediano rufo-purpureo parcissime araneosa, ad 15 cm longa petiolo roseolo vel rufescente colorato incluso. Folia interiora angusta lobata; lobi laterales (utrinque 3–4) patentes vel paulo recurvati vel apice suberecti, anguste triangulares acuminati vel subfalcati, dorso denticulati et saepe fortiter dentati; interlobiis perangustis 1–3 mm latis, ca. 1 cm longis, \pm dentatis vel denticulatis; lobus terminalis elongato-hastatus vel elongato-sagittatus, saepe indeterminato-sublobatus, dentatus, apice integer acutus mucronulatus, vel subacutus, Folia exteriora latiora, interlobiis ad 1 cm longis; lobus terminalis subacutus vel obtusus.

Scapi floriferi foliis suaequilongi, sub involucro araneosi.

Involucrum ad 17 mm longum ad 18 mm latum basi subrotundatum, saepe subpallide viride. Squamae exteriores reflexo-patentes late lanceolatae (ad 2,5 mm latae ad 10 mm longae) basi saepe latae subcordatae vel subauriculatae, sublata albo-marginatae, apice minute callosae vel laeves. Squamae interiores interdum conspicue callosae.

Calathium planum radians ad 3,5 cm diametro luteum. Ligulae marginales planae, extus stria cano-violacea notatae. Antherae polliniferae; stylus et stigmata virescentia. Floret vere.

Achenium rubro-lateritium (*vulpinum*) ca. 5 mm longum (pyramide inclusa) superne argute spinulosum (spinulis pro parte ad 0,4 mm longis), in pyramidem conico-cylindricam 1–1,2 mm longam (spinulis saepe praeditam) subabrupte abiens. Rostrum 8–9 mm longum; pappus niveus 7 mm longus.

Types: Kashmir: between Tangmarg and Gulmarg, 1959, achenes collected, H. B. Singh & v.S. 332 e, f, and sown in Delft Botanical Garden (c. 70, 73, 109, 114, 121, 123) in h, h. BM, DD, LWG, U.

Furthermore:

- Kashmir: Tangmarg, achenes collected in 1959, H. B. Singh & v. S. 335 a; grown in Delft Botanical Garden (c. 45, 51, 52) in h.
 —: Kokarnag, the same, 143 b (c. 113, 130, 132) in h. and h. IARI, LWG.
 —: Banhyhal, 2300 m, 9.6.1959, H. B. Singh & v. S. 352 (h) and 2100 m, 367 (h) and 2050 m, 368 (h).
 —: Verinag, near Resthouse, 2100 m, 18.5.1957, Kaul et al. (h. LWG 41639).
 —: Shalimar, hill nearby the Agronomical Research Institute, 25.5.1959, H. B. Singh & v. S. 134, 135, 138 (h), also grown in Delft Bot. Garden (c. 48).
 —: Dorus, 1500 m, 31.5.1958, D. Thaphyal, Raizada's coll. (h. DD 26359); verisimiliter.

This species resembles *T. gulmargense* v. S., which, however, has straw-coloured achenes. The leaves of *T. gulmargense* are more greyish

green, with a pink or purple-coloured midrib; those of *T. vulpinum* are blue-green and have a metallic lustre and a dark brown-purple midrib. The scapes of *T. gulmargense* generally are more hairy than those of *T. vulpinum*.

Hou-Liu (8), investigating the chromosome number of this species, found for the plants from Tangmarg-Gulmarg 332 e twice $2n = 32$ (tetraploid), once 32 and 24 (chimaera: in the same plant triploid and tetraploid nuclei!); for plants from Tangmarg 335 a she found $2n = 24$ (triploid).

A special form is collected in which the ripe achenes do not become red-brown of maturity:

f. pallidocarpum v. Soest forma nova

Achenia immatura fulvo-straminea, in statu maturo subpallide griseo-brunnea.

- Kashmir: Shalimar, 25.5.1959, H. B. Singh & v. S. 137 b, from achenes sown in Delft Botanical Garden (c. 116, 133, 134) in h, h. IARI, LWG.
 —: Gulmarg, 2600 m, 1.6.1959, v. S. 219 (h) and 2700 m, 4.6.1959, H. B. Singh & v. S. 248, 311 (h).
 —: Srinagar, garden of Nedou's hotel, 23.5.1959, v. S. 117 b, grown from achenes in Delft Botanical Garden (c. 72) in h.
 —: Pahalgam, at the border of the Liddar, 2200 m, 27.5.1959, H. B. Singh & v. S. 152, 156 (h); the same, 12.9.1960, Heybroek 31 (h. v. S.).

The following specimens of which no achenes were available, are mentioned without indication of the form:

- Kashmir: Gulmarg, 2700 m, 1.6.1959, v. S. 200 (h).
 —: Srinagar, Shankracharja, 1800 m, 24.5.1959, H. B. Singh & v. S. 122 (h).
 —: above Shahabad, 1850 m, 10.6.1959, H. B. Singh & v. S. 387 (h).

VIII. SECT. PARVULA v. HANDEL-MAZZETTI 1907

The description given by HM is short and vague: "Achenia rostrata; pappus albus. Involucris folia herbacea, interdum brunnescentia, plerumque decolorato-marginata. Radicis collum plerumque tunicatum". According to HM three species belong to it: *T. brevirostre* HM, *T. dissectum* Ledebour and *T. indicum* HM.

Studying the shape of the achenes in the species classed by HM under this section, I observed the presence of three types:

- 1) achene body gradually elongated into a conical or conico-cylindrical pyramid; rostrum long and thin (Fig. 1c);
- 2) achene body more or less abruptly narrowed in a mostly cylindrical pyramid; rostrum long and thin (Fig. 1b);
- 3) rostrum short, sometimes very short, thick (Fig. 1d).

Type 3) is found in *T. brevirostre* HM, which is closely related to *T. oliganthum* Schott & Kotschy and to *T. iranicum* v. S.; these species constitute sect. *Oligantha* v. S.; *T. brevirostre* can not be regarded as closely related to the swarm of forms which were classed by HM under *T. dissectum* and *T. indicum*.

Type 1) I consider to be the achene which is characteristic for the species in sect. *Parvula* sens. str., whereas type 2) is characteristic for sect. *Kashmirana* and for the not yet described, sect. *Dissecta*, the latter including probably *T. dissectum* Ledeb. sens. str. and *T. bhutanicum* v. S.; the latter species is treated below under "Species incertae sedis".

T. indicum in HM's sense belongs for a large part to sect. *Parvula* sens. str., *T. dissectum* for a large part to sect. *Kashmirana* (and *Dissecta*). Both *T. dissectum* and *T. indicum* in HM's sense are vaguely defined; HM identified very heterogeneous forms to the one as to the other, or sometimes to "intermediate" forms.

As *T. parvulum* (Wallich) DC seems to belong to this section (see under *T. himalaicum*), I wish to retain the name *Parvula* for this section, amending its description as follows:

Achenia rostrata, aurantiaca vel interdum dilute brunnea, in pyramidem longam conicam vel conico-cylindricam sensim abientia. Involucra viridia vel parum rufo- vel purpureo-colorata, sicca non atro-viridia; squamae exteriores saepe late marginatae. Calathia lutea vel flava; stigmata laete lutea. Regiones himalaicae (map II).

The colour of the achenes of *T. indicum*, is said by HM to be pale brown, whereas the great majority of the species belonging to the sect. *Parvula* s. str. have more or less reddish achenes. As HM did not indicate any type material of *T. indicum*, I am unable to obtain a good insight into this species. Sometimes he even referred to this "species" forms belonging to sect. *Vulgaria* Dahlst. and to sect. *Ceratophora* Dahlst.

KEY TO THE SPECIES OF SECT. PARVULA

(As for shortness' sake the leaf form is not considered in this key, it is advisable to use, in addition to the key, the photographs).

- 1a. Leaves grey-green with pale or brownish petioles *T. himalaicum*
- b. Leaves grass green or greyish green with pink or purple petioles 2
- 2a. Achenes straw-coloured or light brown (with a faint fulvous hue) 3
- b. Achenes brown-red or orange 4
- 3a. Achenes up to 5,5 mm long (including the pyramid); pollen absent *T. mucronulatum*
- b. Achenes 6-6,5 mm long, with a faint fulvous hue; pollen present *T. longicarpum*
- 4a. Achenes brownish orange; petioles purple *T. aereum*
- b. Achenes distinctly red-brown or brown-red 5
- 5a. Achenes short, 4 mm long (including the pyramid); leaves often without side lobes or with a few side lobes only (2-3 each side); petioles purple; flowers saturated yellow *T. bankhyhalense*

- b. Achenes 5 mm; leaves distinctly lobate (side lobes 4-6 each side); petioles pink or purple; flowers pale yellow. *T. elegans*

Taraxacum aereum v. Soest **spec. nov.** (Fig. 16).

Planta 5-10(-15) cm alta sat robusta, basi fragmentis foliorum veteriorum incrassata, inferne araneoso-pilosa.

Folia numerosa plerumque terrae adpressa, ad 15 cm longa paulo canescentia glabra, petiolis subangustis ad subalatis nervoque mediano praesertim in parte inferiore rubro-colorato. Folia exteriora lanceolata retroverso-dentata vel -denticulata subacuta vel subobtusata mucronulata; folia interiora lobata; lobi laterales utrinque 2-4, unguiculati acuti ad 2 cm longi integri vel dorso interdum fortiter dentati; interlobiis 3-10 mm latis interdum dentatis; lobus terminalis deltoideus vel hastatus vel elongato-sagittatus, acutus vel obtusus, interdum dentatus, lobuli basales ad 1,5 cm longi retroversi.

Scapi floriferi foliis saepe multo breviores, cuprei dense araneosi.

Involucrum 14 mm longum 14 mm latum crassiusculum. Squamae exteriores ovatae ad 8 mm longae latissime albido-marginatae, purpurascens nervo mediano obscure viride, omnes callosae.

Calathium planum radians ad 3 cm diametro luteum. Ligulae marginales planae extus stria cano-purpurea notatae. Stylus et stigmata laete lutea.

Achenium cupreum ca. 5 mm longum (pyramide inclusa) superne fortiter spinulosum ceterum tuberculatum, in pyramidem conicam ad 1,5 mm longam (spinulis saepe praeditam) sensim abiens. Rostrum 8 mm longum, pappus niveus 7 mm longus.

Typus: Uttar Pradesh: Chakrata, on road to Deoban, 2300 m, 8.11.1960, Heybroek 205 (h. v. S.).

Furthermore:

Uttar Pradesh: Chakrata, Forest div., Bamnai nursery, 2500 m, 11.11.1960, Heybroek 217 pro parte (h. v. S.).

—: Naini Tal, 2250 m, on footpath, 27.10.1960, Heybroek 184 pro parte (h. v. S.).

—: Kumaon, Binsar, 23.10.1960, Heybroek 179 (h. v. S.).

Himachal Pradesh: Hattoo top, near Narkanda, 3150 m, 16.10.1960, Heybroek 151 (h. v. S.).

—: Narkanda, 2630 m, 15.10.1960, Heybroek 151 (h. v. S.).

—: Simla, VI 1863, Brandis 1648 (h. DD).

Kashmir: Sonamarg, 3600 m, 28.7.1928, Stewart 9806 a pro parte (h. RAW).

Pakistan: Murree, hills Changla-Dunga Gali, VI 1955, Webster 5695 (h. RAW).

—: Hazara, Shogsan, Kagan valley, 29.8.1930, Hafiz Khan (h. DD).

—: Hazara, Kuwai Ka Kattha, Khazan, 2400 m, 13.5.1896, Duthie (h. K 19878 a); this specimen was identified by HM as *T. pseudo-nigricans* HM (see also HM 1907) but it is probably *T. aereum*.

This species is reminiscent of two species: *T. banhyhalense* v. S. having the same form of external leaves, but red achenes; and *T. fulvescens* v. S. (sect. *Kashmirana*), having dirty yellow stigmas, the petioles of the leaves less distinctly coloured, and shorter and thicker spinules on the achenes which have a different shape, viz. that which is characteristic for the section *Kashmirana*.

Taraxacum banhyhalense v. Soest **spec. nov.** (Fig. 17).

Planta gracilis florendi tempore ca. 10 cm alta, deinde ad 30 cm alta, inferne parce araneoso-pilosa, basi fragmentis foliorum lucide brunneis inconspicue incrassata.

Folia lanceolata vel oblanceolata obtusa 10–20 cm longa (petiolo purpureo inclusa) ad 2,5 cm lata gramineo-viridia vel paulo canescenti-viridia, in nervo dorsali paulo araneosa, subdense denticulata ad breviter subretroverso-dentata, interdum (folia interiora) unguiculato-lobata; lobi laterales (utrinque 2–3) ad 7 mm longi.

Scapi ad 4 inferne purpurei araneosi, sub involucre dense araneosi.

Involucrum mediocre 10–12 mm longum 12 mm latum pallide viride. Squamae exteriores \pm adpressae apice leviter recurvatae, lanceolatae ad subovatae, ad 6 mm longae ad 2 mm latae late albomarginatae apice \pm violaceae minute corniculatae.

Calathium paulo radians ad 15 cm diametro luteum. Ligulae marginales angustae, canaliculatae, extus rufo-purpureae. Antherae polliniferae; stylus et stigmata lutea; floret vere.

Achenium rubro-lateritium angustum 4 mm longum (pyramide inclusa) superne argute spinulosum ceterum \pm laeve, in pyramidem cylindricam ca. 0,9 mm longam (spinulis interdum praeditam) sensim abiens. Rostrum 6–7 mm longum; pappus albus, 5–6 mm longus.

Typus: Kashmir: Banhyhal, 2300 m, 9.6.1959, H. B. Singh & v. S. 353 (h); also 2400 m, H. B. Singh 344 (h. LWG) and 2550 m, H. B. Singh 345 (h. v. S.), the latter one with reddish dark-brown achenes.

Furthermore:

Kashmir: Verinag forest, 1950 m, 10.6.1959, H. B. Singh & v. S. 377 (h).

—: Kulewan valley near Verinag, in open forest, 2200 m, 20.9.1960, Heybroek 84 e (h. v. S.); forma autumnalis.

Especially when the leaves are all dentate, this species is easily recognizable.

Taraxacum elegans v. Soest **spec. nov.** (Fig. 18).

Planta gracilis ad 12 cm longa, basi dense araneosa fragmentis foliorum veteriorum paulo incrassata.

Folia gramineo-viridia glabra vel juniora sparse araneosa, subcrassa ad 10 cm longa, petiolo angusto roseolo vel laete purpureo incluso. Folia exteriora utrinseque ca. 3-lobata; lobi laterales ad 6 mm longi patentes subobtusius vel acuti, dorso interdum convexo breviter dentati; lobus terminalis ad 17 mm longus subobtusius \pm sinuato-denticulatus vel polygonus, lobuli basales breves. Folia interiora utrinseque 4–6-lobata; lobi laterales ad 1 cm longi patentes vel paulo retroflexi lingulati vel sublineares basi constricti, subobtusius integri vel dorso denticulati; interlobiis denticulatis, argute dentatis vel lineari-lobulatis, ca. 3 mm latis; lobus terminalis subsagittatus vel subdeltoideus raro elongatus (ad 2 cm longus) saepe polygonus obtusus, lobuli basales subobtusius vel subacuti.

Scapi floriferi foliis subaequilongi subaraneosi cuprei, inferne purpurei.

Involucrum 10–12 mm longum, 10–12 mm latum viride. Squamae exteriores laxe adpressae lanceolatae ad 6–8 mm longae ad 2 mm latae saepe ± tricolores, late albo- vel pallide marginatae, parte mediana interdum atro-viridi, apice saepe atro-purpureae, pro parte atro-callosae.

Calathium planum radians ad 2,5 cm diametro flavum. Ligulae marginales planae extus stria cano-purpurea notatae apice aurantiacae vel purpureae. Antherae polliniferae; stylus et stigmata laete lutea. Floret maio-junio.

Achenium 3,7 mm longum (pyramide exclusa) rubro-lateritium superne argute sublonge spinulosum ceterum rugosum, basi laeve, in pyramidem conico-cylindricam 1,2 mm longam (spinulis saepe praeditam) sensim abiens. Rostrum subbreve 4–5 mm; pappus niveus 4,5 mm longus.

Typus: Kashmir: Pahalgam, 2200 m, 27.5.1959, H. B. Singh & v. S. 149 (h, h. LWG), 150 a (h), 153 (h, h. IARI, RAW), 157, 158 (h) on several spots; a shadow modification is 147 b (h), 151 (h).

Furthermore:

Kashmir: E. Liddar valley, near Pahalgam, 2400 m, 28.5.1959, H. B. Singh & v. S. 167 (h, h. K), 170 (h).

—: Gulmarg, 2600 m, 1.6.1959, H. B. Singh & v. S. 225, 226 b (h), 228 (h, h. U); and 2700 m, 1.6.1959, 207 a (h. DD), 214 (h) and 2.6.1959, 245 a, 246 (h).

Kulu: Katrain, on the way to Nagar, 18.4.1959, Mrs. v. Eekelen (h. v. S.).

Nepal: Tak Tor, 3300–3600 m, 1930, Sall Dhwoj 039 a, pro parte (h. BM).

This lovely species has purple petioles, pale green involucre; the outer bracts have a wide margin, often a dark-green midrib and a dark apex. The ligulas are pale yellow with darker tips and are washed purple on the outside. The achenes are bright red.

According to Hou-Liu (8) this is a diploid species ($2n = 16$), according to material from Gulmarg 246.

Taraxacum himalaicum v. Soest 1961; Fig. 4 in this paper.

Area: Afghanistan!, Chinese Turkestan (Yarkand)!, Himalayan region!

In the typical form the achenes are reddish (brown-orange), but the species also has been found with pale brown achenes; this form is described below (f. *kuluense*).

f. himalaicum; in addition to the localities (all from Nepal) given by v. S. 1961:

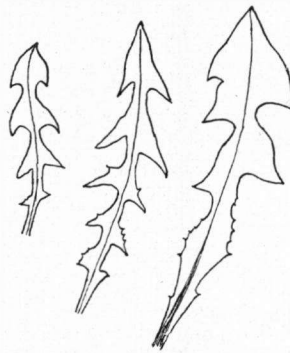
Nepal: Mollugo, 1050 m, 2.4.1961, H. B. Singh et al. 1251 (h. IARI, h. v. S.).

—: Central Nepal, Suikhet, 13.4.1961, H. B. Singh et al. 1423 (h. IARI, h. v. S.).

—: Central Nepal, forest Ghore pani, 2700 m, 11.5.1961, H. B. Singh et al. 1774 (h. IARI, h. v. S.).

—: Dyendrela, 2800 m, 16.6.1952, Zimmermann 849 (h. BM).

Uttar Pradesh: Naini Tal, 2250 m, 27.10.1960, Heybrock 184 pro parte (h. v. S.).

Fig. 4. *T. himalaicum*

- : Kumaon, Naini Tal, VII 1876, Davidson (h. DD), verisimiliter.
 —: Kumaon, R. B. (h. K).
 —: Kumaon, Dewal, 2100 m, in moist shady place, 23.10.1960, Heybroek 159 (h. v. S.).
 —: Kumaon, Mahari Pass, Strachey & Winterbottom (h. K), identified by HM as *T. dissectum*.
 Himachal Pradesh: Simla, 1849, Thomson (h. K).
 Punjab (Kulu): Bashisht, grassy fields, 1850 m, 19.6.1959, H. B. Singh & v. S. 446 b, c, d (h).
 —: west of Manali, 1850–1950 m, 18.6.1959, H. B. Singh & v. S. 425 (h).
 Kashmir: Banhyhal, 2250 m, 9.6.1959, H. B. Singh & v. S. 360 (h, h. LWG) and 2100 m, the same 365 (h).
 —: Verinag, border of rice field, 1860 m, 9.6.1959, H. B. Singh & v. S. 372 (h).
 —: Verinag forest, 1900 m, 10.6.1959, H. B. Singh & v. S. 367 (h).
 —: Pahalgam, E. Liddar valley, 2300 m, 28.5.1959, H. B. Singh & v. S. 162 (h, h. IARI).
 —: Pahalgam, on sandy peninsula in Liddar stream, 2050 m, 13.9.1960, Heybroek 47 pro parte (h. v. S.).
 —: above Shahabad, 1860 m, 10.6.1959, H. B. Singh & v. S. 388 (h).
 Afghanistan: Griffith (h. K).

f. kuluense v. Soest **forma nova**: a *T. himalaico* typico differt acheniis dilute brunneis.

Kulu: grassy fields near Bashisht, 1850, at several places in company with the typical form, 19.6.1959, H. B. Singh & v. S. 446, 446a, 446c2 (h), 446b2 (h, h. LWG).

Furthermore:

- Sikkim: Chiabnajan, in the turf, 3900 m, 5.5.1913, Lacaita (h. BM).
 Nepal: Patu Khola, 750 m, banks track side, 26.3.1952, Polunin, Sykes & Williams 700 (h. BM).
 Uttar Pradesh: Naini Tal, 2250 m, 27.10.1960, Heybroek 184 pro parte (h. v. S.).
 —: Kumaon, Binsar, Dewal, 2100 m, on open ground, sunny slope, 23.10.1960, Heybroek 160 (h. v. S.), aberrant form.
 Himachal Pradesh: between Hattoo and Narkanda, 2700 m, 16.10.1960, Heybroek 145 (h. v. S.).
 —: Theog near Simla, 5.10.1960, Heybroek 119 (h. v. S.).
 —: Kufri near Simla, 2550 m, 5.10.1960, Heybroek 121 (h. v. S.).
 —: from Kalatope to Kainthili, 2700 m, 6.6.1959, Srivastava et al. (h. LWG 60991).

- : Dalhousie, 1800 m, 10.9.1874, Clarke (h. BM 22119), identified by HM as *T. indicum*, see also HM 1907.
- : Theog district, Mahasu, 28.7.1958, Lal et al. (h. LWG).
- Punjab (Kulu): above Pulung, 2850 m, 6.4.1931, Koelz 1836 (h. M), identified by HM as *T. dissectum*.
- Kashmir: Sonamarg, 7.6.1954, Srivastava (h. LWG 11599).
- Swat: Dir-Gujar, 15.7.1956, Beg 1407 (h. RAW).
- Furthermore, without indication of the colour of the achenes:
- Nepal: Ponku-Parangas, 1840 m, 4.11.1954, Zimmermann 2049 (h. BM), a dwarf form.
- : nearby Chyavbas, 1850 m, 31.3.1952, Zimmermann 126 (h. BM), a dwarf form.
- : Ihadey (?), 4000 m, 24.4.1931, Sharma E 225 (h. BM); "in Nepali named Dudfenta, in Scherpa Ngetap".
- : Surjabinayak near Katmandu, 1200–1800 m, 19.4.1949, Pande 55 (h. BM).
- Uttar Pradesh: Mundali, Chakrata Forest div., 2500 m, in shade, 11.11.1960, Heybroek 216 (h. v. S.).
- : Tihri-Garwhal, Ganges valley below Bulmari, 1500–1800 m, 15.6.1883, Duthie 841 (h. K), partly identified by HM as *T. indicum*, see also HM 1907.
- : Kilberry near Naini Tal, 2100 m, 27.10.1960, Heybroek 185 (h. v. S.).
- : Naini Tal, 1800 m, Strachey & Winterbottom (h. K), identified by HM as *T. eriopodum* HM.
- : Kumaon, Wallich (h. K), identified by HM as *T. dissectum*.
- : Binsar, Flagstaff, 2400 m, 23.10.1960, Heybroek 161 (h. v. S.).
- Himachal Pradesh: Chamba, Chvari, 2400 m, 24.6.1899, Harsukh (h. K).
- : Simla, Jako, 16.5.1902, Bourne 3646 (h. K).
- : Simla, Tibet Road, 7.9.1954, Mukerjee (h. LWG 15538)
- Punjab (Kulu): Chandarkhan Pass, 2700 m, 23.6.1959, H. B. Singh & v. S. 533 (h).
- : Rohtang Pass, near Rahla, 2760 m, 20.6.1959, H. B. Singh & v. S. 471 (h).
- Spiti: northern foot of Tari Pass via Mud to southern foot of Parang Pass, 12–17.6.1856, Schlagintweit 6973 (h. BM).
- : West of Sara (?), (h. K).
- Kashmir: Tangmarg, 2100 m, 6.6.1959, H. B. Singh & v. S. 333 (h, h. RAW).
- : Gulmarg, 2700 m, X 1953, Kaul et al. (h. LWG).
- : Batata, 1740 m, 25.6.1955, Kaul et al. (h. LWG 23170).
- Baltistan: Khapalu, left side of the Shayok, 12.7.1856, Schlagintweit 5724 (h. BM), identified by HM as "*T. parvulum-indicum intercedens*".
- Himalaya 1800 m, 1844 Edgeworth 206 (h. K), identified by HM as *T. dissectum*.

Wallich described *Leontodon parvulum*, which was renamed *T. parvulum* DC 1838, and included by HM 1907 in *T. dissectum* (in HM's sense). Neither Wallich nor DC gave any indication with regard to the shape of the achene, or with regard to its colour; the type material of this species I know from h. G (h. DC) and from h. K. As I made no notes on the achenes, when studying the Geneva specimen, I suppose that they were not present in that sample; in h. K they are certainly lacking. *T. parvulum* will probably have to be classed within *T. himalaicum*, and it might even be necessary to replace the name *T. himalaicum* by *T. parvulum*; before doing this, we should try to find out what the achene colour is in Wallich's material of *T. parvulum*. The type material of the latter was quoted under *T. dissectum* in HM 1907 (Kumaon).

Taraxacum longicarpum v. Soest spec. nov.

Planta mediocris 8–12 cm alta, inferne araneoso-pilosa, basi fragmentis foliorum veteriorum incrassata.

Folia decumbentia gramineo-viridia paulo canescentia subglabra denique glabra, lobata 5–8 cm longa petiolo brevi roseolo vel purpureo incluso; lobi laterales utrinque 3–4, unguiculati triangulares vel falcati summo recurvato, ad 1 cm longi integri; interlobiis brevibus latis vel sublatis interdum paulo denticulatis vel dentatis; lobus terminalis hastatus vel deltoideus subacutus vel subobtusus 1,5–2 cm longus integer vel 1 dente munitus, lobuli basales ad 8 mm longi acuti recurvati.

Scapi floriferi foliis aequilongi vel ea superantes, sub involucrio araneosi.

Involucrum ca. 1 cm longum, ca. 9 mm latum obscure viride. Squamae exteriores ad 6 mm longae anguste ovatae, inconspicue vel interdum sublatae marginatae, omnes laeves.

Calathium planum radians ca. 3 cm diametro flavum(?). Ligulae marginales planae extus stria cano-violacea notatae. Antherae polliniferae; stylus et stigmata laete lutea. Floret vere et aestate.

Achenium fulvo-stramineum 6–6,5 mm longum (pyramide inclusa) dense spinulosum, basi laeve, in pyramidem cylindricam spinulis praeditam ca. 2 mm longam sensim abiens; rostrum 7–8 mm longum; pappus albus ca. 6 mm longus.

Typus: Kashmir: Kishtwar, Doola, 17.7.1956, Sarau et al. (h. LWG 30054).

Furthermore:

Uttar Pradesh: Chakrata, 2100 m, 17.6.1946, Raizada (h. DD 98049).

—: Mussoorie, Brandis 1649 (h. DD).

Pakistan: Hazara, Abbotabad, 1260 m, IV.1935, Stewart (h. RAW 14662 a).

—: Gilgit exp., Giles (h. K); identified by HM as "*T. officinale-alpinum* pl. *intercedens*", see also HM 1907; in my meaning it is verisimiliter *T. longi-carpum*. Neither *T. officinale* nor *T. alpinum* have such a long pyramid!

Himalaya Bor. Occ. Regio temp., 2100–3600 m, Thomson (h. L, pro parte).

This species is reminiscent of *T. himalaicum* (and of its *f. kuluense*), but the achenes are longer and more spinulate, and the leaves have a different shape—very constant in the material cited above—with clawlike lobes.

Taraxacum mucronulatum v. Soest, 1961.

Area: Nepal!; in v. S. 1961 the locality is given; as the shape of the achenes and the other characters too fit very well into our picture of sect. *Parvula* HM em. v. S., it is now included in the latter. No further localities are known.

IX. SECT. TIBETANA v. SOEST SECT. NOV.

Achenia dilute brunnea- vel rubro-lateritia, subparva (ca. 4 mm) large spinulosa, in pyramidem breviter cylindricam abientia, rostrata; pappus albus vel sordide albus. Pili araneosi saepe dilute brunnei. Involucra (praesertim in statu sicco) subnigra vel nigra; squamae callosae vel corniculatae, raro laeves, exteriores laxe adpressae saepe emarginatae. Flores saturate lutei, flavi, citrini vel albescentes; stylus

et stigmata (in siccitate) nigra vel subnigra. Floret aestate, raro vere.

Type species: T. tibetanum HM.

According to HM 1923, 5 species belong to Ser. B) *Deducta* HM of sect. *Borealia* HM, viz. *T. sikkimense* HM, *T. ceratophorum* (Ledebour) DC, *T. tibetanum* HM, *T. mongolicum* HM, *T. eriopodum* (Don) DC. Dahlstedt recognized *T. ceratophorum* as representing a new sect. *Ceratophora* Dahlst. and *T. mongolicum* as representing a new sect. *Mongolica* Dahlst. The three remaining species, in fact, constitute a more homogeneous group, which I give the name sect. *Tibetana*, including a number of other species, one of which is *T. wattii* Hooker, of which I could compare the poor type material with other more complete specimens collected afterwards by other botanists.

In dried condition the black involucre and the black styles and stigmas are very characteristic for the species of this section; sometimes brownish araneous hairs occur, and such hairs are not known in other sections; also dirty white pappus hairs are often present. The area of distribution of this section is: C. Asia, from the Himalayas through Tibet to W. China.

KEY TO THE SPECIES

(As the leaf form is not considered here, it is advisable to compare the figures of the plants or of the leaves, when using the key).

- | | |
|---|-------------------------|
| 1a. Achenes reddish | 2 |
| b. Achenes light brown | 5 |
| 2a. Pappus hairs dirty white to brownish. | 3 |
| b. Pappus hairs pure white | 4 |
| 3a. Involucre narrow, truncate; spinules of the achenes partly recurved | <i>T. heybroekii</i> |
| b. Involucre broad, ± rotundate; spinules mostly straight | <i>T. eriopodum</i> |
| 4a. Outer ligulas whitish inside, purple outside; inner flowers yellow | <i>T. sikkimense</i> |
| b. Flowers yellow, outer ligulas outside ± lacking stripes; araneous hairs below the flower head nearly absent | <i>T. apargiaeforme</i> |
| 5a. Stigmas (in dried condition) dark green but not blackish; outer involucre bracts with (indistinct) margin (Compare also <i>T. forrestii</i>) | <i>T. mitalii</i> |
| b. Stigmas (in dried condition) nearly black; outer bracts marginate or emarginate | 6 |
| 6a. Pappus hairs dirty white; outer involucre bracts long, linear (compare also <i>T. stewartii</i>). | <i>T. nasiri</i> |
| b. Pappus hairs pure white | 7 |
| 7a. Araneous hairs brownish | 8 |
| b. Araneous hairs white | 9 |
| 8a. Ligulas lemon; outer involucre bracts ± ovate <i>T. tibetanum</i> | |

- b. Ligulas saturate yellow; outer bracts \pm lanceolate *T. kashmirensis*
- 9a. Achenes with echinate ribs, between the ribs no spinules; outer involucre bracts ovate *T. wattii* 10
- b. Achenes spinulate 10
- 10a. Outer involucre bracts emarginate 11
- b. Outer involucre bracts distinctly or indistinctly marginate 12
- 11a. Outer involucre bracts linear to linear-lanceolate, with small gibbosities *T. pseudo-stenolepium*
- b. Outer bracts ovate; gibbosities absent *T. nigrum*
- 12a. Outer involucre bracts lanceolate; gibbosities absent *T. stewartii*
- b. Outer bracts lanceolate-ovate; small horns present *T. pseudo-stevenii*

Taraxacum apargiaeforme Dahlstedt 1926, c. icon.

Area: China (Sze-chuan); Bhutan!; Sikkim!; Ladakh!

Localities:

- Bhutan: N.E. Bhutan, Cho La, 3900 m, 4.2.1949, Ludlow, Sherriff & Hicks 20797 (h. BM).
- : Sikkim: Donkia, 4800–5100 m, 16.8.1892, Gammie 813 (h. BM); in HM 1907 mentioned as *T. heteroloma* HM.
- Ladakh: Yangu Nullah, 4200 m, 3.7.1903, Younghusband (h. L), in HM 1907 mentioned as *T. heteroloma* HM.
- : Stok Nullah, 4800 m, 12.8.1941, Ludlow & Sherriff 8556 (h. BM).
-: Laphthal 4200 m, VIII 1929, Benham (h. BM).

Even in case the shape of the leaves is not fully characteristic, *T. apargiaeforme* can easily be recognized by the lack of araneous hairs on the scape, even immediately under the flower head, and by the absence (or nearly so) of coloured stripes at the outside of the ligulas.

Taraxacum eriopodum De Candolle 1838; v. Handel-Mazzetti 1907 pro parte, c. icon.; 1923, p. 265.

? *Leontodon eriopodum* Don, Mem. Wern. Soc. Edinb. 3 (1820) p. 413 (non vid.!); Don, Prodr. Fl. Nepal (1825) p. 123; *L. eriopus* Don in Sprengel, Linnaei Syt. Veg. 16e ed. III (1826) p. 658.

Area: W. China!, Tibet!, Himalayan region!

Though the herbaria contain a rather rich collection of specimens considered to be *T. eriopodum*, only a few of them are furnished with achenes; moreover, HM is the only author describing the colour of the achenes: “pallidiuscule vel fuscobrunnea”.

Plants collected by Wallich must be considered as type material of this species; they bear two different labels: “B. Kamaon” and “Nepalia 1830”, both in h. DC; the material from Kumaon is also in h. K, that of Nepal also in h. L. Material from Hara Ratani (Kumaon), collected by Strachey and Winterbottom (h. K.), seeming totally identical with the material from Kumaon collected by Wallich.

The plants of Nepal as well as specimens collected by Strachey and Winterbottom show reddish achenes. Specimens collected in C. Nepal by H. B. Singh and in Kashmir (Pahalgam) by Stewart, also show reddish achenes. Nonred achenes occur in two groups of specimens identified by HM as *T. eriopodum*, but in my opinion they do not belong to this species, one e.g. being *T. himalaicum* f. *kuluense*.

Therefore the description given by HM, has to be changed as far as the colour of the achenes is concerned, into: "achenia rufa"; furthermore, it may be useful to add to the description two very constant characters: "styli and stigmata (siccitate) nigra" and "pappus sordide albus".

Localities:

- Assam: Poshing La, 3000–3600 m, 22.7.1938, Kingdon-Ward (h. BM 13976).
 Bhutan: Ha, and to Chile La, 2700–3600 m, 22.7.1938, Gould 1256 (h. DD!, h. K!).
 Sikkim: 3300–5400 m, Hooker (h. S!, identified by HM), see also HM 1907.
 —: Nating, 27.8.1878, Dembro (h. K!, identified by HM), see also HM 1907.
 —: Tsomgo, 3600 m, 18.8.1945, Bor's collect. 1032 (h. DD).
 —: Ganga, 4800 m, 6.9.1911, Ribu & Rhomoo 5343 (h. G).
 —: VII 1879, Kevy (?) (h. K).
 Nepal: Iharey (or Sharey?), 3900–4500 m, 1927, Wigram (?) (h. K).
 —: Rimche, 7.9.1935, Bailey's collect. 17 (h. BM).
 —: Kyangjin Ghyang (C. Nepal), 4000 m, VIII 1949, Popunin 1679 (h. BM).
 —: Ringmigaon, Phoksumdo Tal, 4500 m, 21.9.1952, Polunin, Sykes & Williams 3529 (h. BM); "flowers pale yellow".
 —: near Chalike Pahor, 4350 m, 6.8.1954, Stainton, Sykes & Williams 3771 (h. BM).
 —: 1830, Wallich (h. DC!, h. L!).
 —: C. Nepal, forest near Dhamu, 5.5.1961, H. B. Singh & al. 1696 (h. IARI, h. v. S.).
 Uttar Pradesh: Kumaon, Wallich (h. DC!, h. K!).
 —: Kumaon, Hara Ratani, 3600 m, Strachey & Winterbottom (h. K!, identified by HM).
 —: Pendari, 3300 m, 5.10.1848, Dwalee, Ralam, 3600 m, Strachey & Winterbottom (h. K!, identified by HM), see also HM 1907.
 Kashmir: above Fras Nag, 2700–3000 m, 1.8.1947, Stewart & Nasir (h. RAW 23217); involucre rather pale.
 —: 1833, Royle (h. DC!, identified by HM), see also HM 1907.
 —: Liddar valley above Pahalgam, VIII 1925, Stewart 8403 (h. RAW).

***Taraxacum forrestii* v. Soest 1961, c. icon.**

Area: S.E. Tibet!, India: Uttar Pradesh!; no further localities are to be reported.

It is uncertain whether this species really belongs to sect. *Tibetana*; in v. S. l.c. relationship to sect. *Mongolica* was suggested, the outer involucre bracts being distinctly veined and having small horns at their apex. The *Mongolica* have their area of distribution more to the N.E.: Mongolia, China and Japan.

***Taraxacum heybroekii* v. Soest spec. nov. (Fig. 19).**

Planta florendi tempore ad 20 cm alta subglabra, collo paulo brunneo-araneosa.

Folia longe purpurascens petiolata ad 20 cm longa gramineo-viridia, exteriora paulo lobata fortiter dentata saepe ± ovata vel

oblanceolata subobtusata. Folia interiora utrinseque ca. 4-lobata; lobi laterales triangulares ad 2 cm longi acuti ad subobtusati dorso convexo, margine in parte inferiore saepe grosse dentato; interlobiis saepe \pm indeterminatis, aliter sublobulatis vel grosse deltoideo-dentatis; lobus terminalis ad 3 cm longus late deltoideus vel plerumque hamatus subobtusatus integer vel late dentatus vel sublobulatus, lobuli basales subacuti.

Scapi tenues, sub involucrio dense brunneo-araneosi.

Involucrium angustum 7–8 mm latum ad 15 mm longum, basi truncatum subcontractum in scapo, subobscure viride. Squamae exteriores laxe adpressae apice \pm reflexo-patentes lineares ad anguste lanceolatae 0,7–1,2 mm latae ad 5 mm longae immarginatae brunneo-ciliatae subobtusatae. Squamae interiores latiores late membranaceo-marginatae apice violaceae subcallosae.

Calathium paulo radians 1,5 cm diametro saturate luteum. Ligulae marginales planae extus stria cano-violacea notatae. Antherae polliniferae; stylus et stigmata (siccitate) nigra.

Achenium (immaturum aurantiacum) maturum obscure rufobrunneum 5 mm longum (pyramide inclusa) dense et longe spinulosum, spinulis pro parte patentibus vel apice recurvatis, basi rugosum, in pyramidem conico-cylindricam (spinulis praeditam) ca. 1,5 mm longam sensim abiens. Rostrum ad 8 mm longum; pappus conspicue sordide albus ca. 6 mm longus.

Typus: Kulu: near Kothi, 2500 m. 29.9.1960, Heybroek 109a (h. v. S.).

Furthermore:

Kulu: Edgeworth 5041 (h. K); mentioned by HM 1907 as *T. eriopodum*.

—: Rohtang Pass, between Marhi and top, 3600 m, 25.9.1960, Heybroek 99k and 100 (h. v. S.).

—: Rohtang Pass, 3150 m, 25.9.1960, Heybroek 99 (h. v. S.).

Kashmir: Gulmarg, 2550 m, 24.8.1919, Richardson 1295 (h. K).

Lahul: Sissu, 3030 m, 4.7.1938, Bor 12475 (h. K).

This species is easily recognizable by its narrow flower heads with truncate base. It might be related to *T. coronatum* HM, of which I have not seen the type material, nor other dried specimens. Comparing *T. heybroekii* with the description given by HM 1907 of *T. coronatum* and with the drawings of a flower head and of an achene, it may be stated that, though in both cases the spinules of the achenes are spreading, they form in *T. coronatum* a kind of crown under the pyramid but not in *T. heybroekii*; furthermore in *T. heybroekii* the body of the achene is more gradually elongated in the pyramid as it is in *T. coronatum*; *T. heybroekii* has orange-brown achenes, *T. coronatum* has pale brown achenes ("griseo-brunnea"). Besides this, *T. heybroekii* has a dense araneous cover on the scapes, emarginate outer involucrial bracts, and saturated yellow ligulas.

According to Hou-Liu (1963), the chromosome number, is, in material from the Rohtang Pass (Kothi): $2n = 16$, which means that its is a diploid species.

Taraxacum kashmirensis v. Soest 1961.

Area: Kashmir!, N. Pakistan!

To the type-locality (Vishansar in Kashmir) the following localities can be added:

Kashmir: Mengandob, in short grazed turf, 3600 m, 6.9.1956, Polunin 718 (h. BM); the achenes (immature!) appear to be straw-coloured; in the original description no colour is mentioned.

——: Kolohoi valley, below the pass, 4260 m, 27.8.1956, Polunin 552 (h. BM).

——: Yamhar Pass, 3600 m, IX 1931, Stewart (h. K, h. RAW 12736); verisimiliter, a dwarf form.

——: Kamri valley, 3300–3600 m, 25.8.1892, Duthie (h. K).

Pakistan: Hazara, Kagan valley, 3600 m, 21.7.1896, Inayat 19879 a (h. K).

In both exsiccata of Polunin mentioned above, the colour of the flowers is described as "orange-yellow"; in the original description only "lutea" is mentioned. This addition facilitates the distinction from the related *T. tibetanum* HM, which has pale yellow flowers, according to HM 1923: "citrina"; in addition to the original description of *T. tibetanum* HM 1907, HM 1923 mentions that it is also found with narrower outer involucre bracts; apparently he has seen this in a number of plants from Chinese localities; this should make the distinction of the two species more difficult.

There are a few plants from Kashmir, not mentioned here, which have yellow-green, scarcely dentate leaves, which may or may not be identical with *T. kashmirensis*: if similar material, but then furnished with achenes, becomes available a closer examination may decide the question. Furthermore, an interesting form has been collected, also with yellow-green leaves, provided with obtuse dents or short side lobes; the achenes of these plants are fulvous: Kashmir: Pahalgam, Lake Tulion, 3600 m, 28.8.1945, Stewart (h. K, RAW); this might represent a new species; here too a closer examination, when fully ripe achenes become available, seems necessary.

Taraxacum mitalii v. Soest *spec. nov.* (Fig. 20).

Planta sat robusta in formis alpinensis humilis, subgrosse araneoso-pilosa.

Folia cano-viridia saepe rufescentia vel purpurascencia utrinsecus 3–4-lobata, petiolis subangustis rufescenti-purpureis vel pallidioribus; lobi laterales triangulares vel ± deltoidei vel subfalcati 5–10(–20) mm longi acuti vel subacuti submucronulati dorso interdum denticulati vel ad maiores dentati; interlobis dentatis et denticulatis; lobus terminalis subhastatus saepe elongatus ad 3 cm longus inciso-dentatus vel inciso-lobulatus, subacutus submucronulatus. Folia exteriora paulo lobata.

Scapi saepe numerosi, floriferi foliis subaequilongi.

Involucrum mediocre 12–15 mm longum crassiusculum obscure viride saepe glaucescens. Squamae callosae vel minute corniculatae, exteriores adpressae ovatae vel lanceolatae 6–7 mm longae pallide marginatae vel roseolo-marginatae.

Calathium radians 3–4 cm diametro luteum. Ligulae marginales planae extus stria atro-violacea vel atro-purpurea notatae. Antherae polliniferae; stylus sordide luteus; stigmata subobscura virescentia, siccitate sub-nigra.

Achenium 3,5 mm longum (pyramide exclusa) olivaceo-stramineum superne grosse argute spinulosum ceterum rugosum, basi laeve, in pyramidem conico-cylindricam ca. 1 mm longam subsensim abiens. Rostrum 7 mm longum; pappus albus 5 mm longus.

Typus: Singalilla ridge, along the eastern border of Nepal: Tonglu, nearby dakbungalow, 3200 m, 5.5.1959, Chatterjee, Mital & v. S. 20 (h, h. DD, IARI, LWG, RAW, U); probably *T. mitalii* is the only *Taraxacum* species of the Singalilla range from Tonglu up to the Singalilla top. It is collected on this same expedition: surroundings of Tonglu 32 (h. v. S., Chatterjee no. 234), 39 (h, h. BM); between Tonglu and Sandakphu 40, 49 (h); Kalapokhri 50 (h); surroundings of Sandakphu 51 (h, h. MH), 52 (h); between Sandakphu and Phallut 54 (h), 55a (h. LWG), 67 (h); nearby Phallut 57, 58 (h); between Phallut and Singalilla 56a (h, h. K); slopes of Singalilla 55' (h). All these between 3150 and 3600 m, 5–10.5.1959.

Furthermore:

Burma: distr. Myitkyina, Panwa Pass, 2250 m, 2.4.1938, Kermodé (h. DD, K).
Sikkim: Lhonah, 4800–5700 m, 1936, Chapman 119 (h. K).

Nepal: Arun valley, Maghang Khola, E. of Num, on open grass, 3300 m, 1.5.1956, Stainton 185 (h. BM).

—: Marsiandi valley, 3450 m, 9.6.1950, Lowndes 967 pro parte (h. BM).

—: Mustang, 4500 m, 5.8.1954, Stainton, Sykes & Williams 2189 a (h. BM).

—: near Jukumsilang, 2400 m, 24.4.1954, Stainton, Sykes & Williams 2576 (h. BM).

—: above Chipli, north of Pokhara, 2400 m, 18.4.1954, Stainton, Sykes & Williams 4869 (h. BM).

—: C. Nepal, Ulleri 1950 m, 1961, H. B. Singh et al. 1486 (h. IARI, h. v. S.).

—: C. Nepal, Ohampu, 2400 m, 22.4.1961, H. B. Singh et al. 1537 (h. IARI, h. v. S.).

—: Cl Nepal, Kagbeni, 2700–2850 m, 26.4.1961, H. B. Singh et al. 1588 (h. IARI, h. v. S.).

—: C. Nepal, up Ghasa, 22.4.1961, H. B. Singh et al. 1527 (h. IARI, h. v. S.).

—: Kuyogoma Khola, west of Kehami, 4000 m, 12.8.1955, Lobbichler 56 (h. M).

—: Lulo Khola, 4500 m, growing in *Rhododendron lepidotum* and *Spiraea* dwarf shrub community, 30.6.1953, Polunin, Sykes & Williams 1459, 1462 (h. BM).

Also in S. Tibet: Chumbi valley, Jatung, 3000 m, 15.5.1945, Bor & Kirat Ram 19245 (h. DD).

—: Chumbi valley, Phari, 4300 m, 18.6.1945, Bor & Kirat Ram 20441 (h. K).

—: Rongshar vally, 3300 m, 27.6.1924, Hingston (h. K).

—: Pipitang, below monastery, 3150 m, 11.4.1938, Ludlow, Sherriff & Taylor 4053 (h. BM).

Possibly plants from Uttar Pradesh: Kumaon, Bageser to Munshari via Kathi and Namik, 1500–2340 m, 24–31.5.1855, Klatt 9807 (h. M), identified by HM as *T. alpinum*, may belong to this species.

The area of distribution extends over the eastern Himalayan region; *T. mitalii* is growing there between 2400 and 4500 m altitude in grassy fields, often in the neighbourhood of tracks and other signs of

human influence, often in the half-shadow of *Rhododendron* shrubs.¹⁾

The styles and stigmas are not as dark as is usual in this section; however the shape of the achenes indicates a position in this group.

According to Hou-Liu (8) the chromosome number of plants from the Singalilla ridge, is $2n = 24$, which means that these plants are triploid.

Taraxacum nasiri v. Soest **spec. nov.** (Fig. 2c, d).

Planta humilis ca. 5 cm alta, basi araneosa fragmentis foliorum veteriorum paulo incrassata.

Folia decumbentia ad 8 cm longa ad 1,5 cm lata gramineo-viridia lobata subaraneosa, petiolis pallidis; lobi laterales utrinque ad 3, anguste triangulares integri valde acuti valde retroversi ad 1 cm longi; interlobiis ad 3 mm latis ad 8 mm longis, angulis loborum \pm plicatulis; lobus terminalis ad 2,5 cm longus indeterminatus incisus vel dentatus acutus, lobuli basales retroversi acuti.

Scapi araneosi floriferi foliis breviores.

Involucrum ad 12 mm longum ad 12 mm latum basi inconspicue truncatum, obscure viride. Squamae exteriores laxe adpressae lineares ad 10 mm longae ad 1,5 mm latae inconspicue vel anguste marginatae, omnes laeves.

Calathium paulo radians (?) pallide luteum. Ligulae marginales planae extus stria rufo-violacea notatae. Antherae polliniferae; stylus et stigmata livescentia (?), siccitate subnigra. Floret aestate.

Achenium (plene maturum ignotum) ca. 6 mm longum (pyramide inclusa) pallide stramineum superne squamuloso-spinulosum ceterum laeve, in pyramidem conico-cylindricam subabrupte abiens; rostrum ca. 8 mm longus; pappus pallide brunnescens ca. 5 mm longus.

Typus: Kashmir: Kamri Pass, 3300 m, 14.7.1946, Stewart & Nasir (h. RAW 22665); "ligules pale" and "seeds whitish, much broader above, ridged, a few teeth at upper end, narrowly ribbed. Pappus rusty".

Furthermore:

Swat: Batain above Ushu, 2700–3000 m, 28.7.1953, Stewart & Rahman 25385, pro parte (h. BM).

This species has much in common with *T. wattii* Hook., but it is easily distinguishable from the latter by the retroverse side lobes, the very acute and narrow terminal lobe, and the linear outer involucre bracts, which are slightly marginate.

Taraxacum nigrum v. Soest **spec. nov.** (Fig. 21).

Planta ad 30 cm alta gracilis basi fragmentis foliorum veteriorum nigris inconspicue incrassata.

¹⁾ With grasses, *Anemone obtusiloba* Don, *Aconitum ferox* Wall., *Berberis wallichii* DC, *Cotoneaster microphylla* Wall. ex Lindl., *Gaultheria nummularioides* Don and *trichophylla* Royle, *Rhododendron arboreum* Sm., *campylocarpum* Hook. and *lepidotum* Wall., *Viburnum erubescens* Wall.

Folia 15 cm longa (petiolo roseolo ad 10 cm longo excluso) gramineo-viridia paulo araneosa lobata; lobi laterales utrinque 5–6 triangulares vel late unguiculati saepe apice retroversi, acuti vel subacuti 1–1,5 cm longi dorso saepe valde convexo 0–1 dente munito, margine inferiore recto vel concavo integro; interlobiis subnullis, angulis loborum plicatulis; lobus terminalis indeterminato-elongato-hastatus, saepe sublobulatus, 2–4 cm longus subacutus, lobuli basales deltoidei patentes 1–1,5 cm longi.

Scapi floriferi foliis subaequilongi cuprei sub involucre dense sublonge albo-araneosi.

Involucrum crassiusculum ca. 15 mm longum 15 mm latum atroviride. Squamae exteriores adpressae ovatae ca. 7–8 mm longae ca. 4 mm latae ciliolatae emarginatae apice atropurpureae, omnes laeves.

Calathium planum radians ad 3 cm diametro saturate luteum. Ligulae marginales pro parte canaliculatae, extus stria cano-purpurea notatae. Antherae polliniferae; stylus (exsertus) et stigmata siccitate nigra. Floret aestate.

Achenium dilute brunneum parvum 3,5 mm (pyramide inclusa) superne spinulosum ceterum rugosum, basi laeve, in pyramidem conico-cylindricam ca. 0,5 mm longam abrupte abiens. Rostrum ad 10 mm longum; pappus albus 5 mm longus.

Typus: Karakoram: Minapin Glacier, ungrazed "island" in glacier meadow, 3600 m, 8.8.1961, Lloyd & Megan 75 (h. BM).

This species is related to *T. tibetanum* HM and to *T. kashmirensis* v. S.; it differs from them in various points; the achenes are very small; the outer involucral bracts are emarginate; the araneous hairs on the scape are pure white; the shape of the leaves is very different. The rostrum of *T. nigrum* is remarkably long; the stigmas are borne by long styles and exceed the other parts of the flower.

***Taraxacum pseudo-stenolepium* v. Soest spec. nov.** (Fig. 22).

Planta gracilis ad 25 cm alta basi glabra.

Folia ad 20 cm longa glabra laete viridia petiolo longo angustissimo pallido incluso, lineari-lanceolata (exteriora oblanceolata) subobtusata vel subacuta breviter obtuse vel subacute retroverso-dentata vel denticulata vel pro parte breviter deltoideo-lobata.

Scapi basi purpurei, sub involucre araneosi.

Involucrum mediocre ad 13 mm longum ad 11 mm latum atroviride. Squamae exteriores laxae adpressae lanceolatae vel lineari-lanceolatae emarginatae, pro parte inconspicue callosae.

Calathium flavum (?) ca. 1,5 cm diametro. Ligulae marginales extus stria cano-violacea notatae. Antherae polliniferae; stylus et stigmata subnigra. Floret aestate.

Achenium (maturum ignotum) pallide brunneum superne spinulosum in pyramidem conicam abiens, rostratum; pappus albus.

Typus: Kashmir: Sonamarg, ca. 3900 m, 18.8.1928, Stewart 9831 (h.K.).

Furthermore:

Tihri-Garhwal: Dudu Glacier moraine, 4200–4500 m, under Srikanta, 10.8.1883, Duthie 843 (h. BM, h. K, both identified by HM as *T. stenolepium* HM), see also HM 1907.

This species is easily distinguishable from *T. stenolepium* by totally black involucre (at least in dried condition) and by the entirely emarginate, slightly wider outer bracts.

Taraxacum pseudo-stevenii v. Soest **spec. nov.**

Planta parva 3–9 cm alta basi fragmentis foliorum veteriorum incrassata, inferne glabra.

Folia ad 6 cm longa petiolo angusto pallido vel roseolo incluso, glabra luteo-viridia lanceolata vel oblanceolata integra vel denticulata vel dentata, dentes ad 3 mm longi.

Scapi cuprei sub involucre araneosi.

Involucrum mediocre 11 mm latum, ad 13 mm longum atro-viride. Squamae exteriores ovatae vel ovato-lanceolatae 3–6 mm longae ± imbricatae anguste ad sublata albo-marginatae corniculatae; interiores callosae.

Calathium ad 2,5 cm diametro luteum. Ligulae marginales planae extus concolores vel stria grisea notatae. Antherae polliniferae: stylus et stigmata (siccitate) nigra. Achenium ignotum.

Typus: northern slope of Lachengla, 4950 m, Lal, Chandra & Kapoor (h. LWG 36373).

Furthermore:

Ladakh: Kichik Kumdan Glacier, grassy plots of ground, 4950 m, 28.7.1929, Ludlow 574, pro parte (h. BM).

—: Tsakzhun, along stream in meadow, 4500 m, 21.7.1931, Koelz 2399a (h. W).

.....: Thato Pass, 4200–4500 m (“Naini Tal to Srinagar”), 1919, Benham (h. BM).

This species is reminiscent of *T. stevenii* (Spreng.) DC em. HM, but it belongs to sect. *Tibetana* v. S.; from *T. tibetanum* HM it is easily distinguishable by the white margin on the outer involucre bracts.

Taraxacum sikkimense v. Handel-Mazzetti 1907, c. icon.; 1923, p. 269.

Area: Sikkim!, Nepal!, E. Himalayas!, Tibet!, Setschuan!

Localities:

E. Himalaya: Palong, 4500 m, 31.5.1935, Townend 685 (h. RAW).

Sikkim: 3300–5400 m, Hooker (h. K!, identified by HM; h. BM).

—: Lachen, 3300–3600 m, 16.7.1849, Hooker (h. K!, identified by HM), see also HM 1907.

—: Jungu, 3600–3900 m, 23.7.1849, Hooker (h. K!, identified by HM).

Nepal: E. Nepal, Tamur valley, Yangma Khola, N.E. of Walungchung Gola, 4650 m, 24.7.1956, Stainton 1097 (h. BM).

—: Central Nepal, Changbu Khola, grassy slopes, 4350 m, 15.6.1949, Polunin 317 (h. BM).

On account of the red colour of the achenes HM 1907 included this species in sect. *Erythrocarpa* HM; in 1923, however, he removed it to sect. *Borealia* HM, in the vicinity of *T. ceratophorum* (Ledeb.) DC; in fact the *Tibetana* are related to the *Ceratophora* Dahlst., both belonging to the "supersect." *Borealia*.

According to HM 1907, the flowers are "citrini?, extus rubro striati", but in a note they are called "virescenti-albi, sec. adnotationem in herb. Kew". On the label of Stainton 1097 we read "outer flowers pinkish white, inner ones yellow".

Taraxacum stewartii v. Soest **spec. nov.** (Fig. 23).

Planta ad 20 cm alta basi pallida glabra.

Folia numerosa erecta laete gramineo-viridia glabra 10–15 cm longa petiolo angusto roseolo incluso, lobata; lobi laterales (utrinque ca. 4) lineares vel falcati patentes vel retroversi vel erecti, ad 12 mm longi acutissimi interdum denticulati vel minute dentati; interlobiis angustis (1–3 mm latis) saepe dentatis vel sub-lobulatis; lobus terminalis linearis ad 3 cm longus 2–4 mm latus acutissimus. Folia exteriora ad 5 cm longa \pm lanceolata minute retroverso-dentata acuminata, in petiolum 4 cm longum decurrentibus.

Scapi cuprei floriferi folia superantes sub involucri sordide alboparaneosi.

Involucrum crassiusculum 12 mm longum ad 14 mm latum obscure viride. Squamae exteriores laxae adpressae lanceolatae ad 2,5 mm latae ad 8 mm longae inconspicue pallide marginatae, omnes laeves.

Calathium ad 2,5 cm diametro, flavum(?). Ligulae marginales planae extus stria cano-violacea notatae, summo \pm nigrae. Antherae; polliniferae; stylus et stigmata (siccitate) nigra. Floret aestate.

Achenium maturum ignotum, immaturum pallide brunneum ca. 5 mm longum superne spinulosum, in pyramidem conicam 1 mm longam sensim abiens. Rostrum subcrassum (?); pappus sordide? albus 6 mm longus.

Typus: Kashmir: Tragbal Pass, 3620 m, 24.7.1919, R. R. & I. D. Stewart 4624 (h. RAW).

Taraxacum tibetanum v. Handel-Mazzetti 1907, c. icon.; 1923, p. 264.

Area: W. China!, Tibet!, Bhutan!, Sikkim!

Localities:

Bhutan: Pangotang Tsampa, 3600 m, 15.6.1949, Ludlow, Sherriff & Hicks 19153 (h. K); the involucral bracts seeming slightly paler of colour than usual.

Sikkim: 3300–5400 m, Hooker (h. BM!), identified by HM, see also HM 1907.

—: Nathu La, 4200 m, 19.10.1942, Ludlow & Sherriff 10079 (h. BM).

HM 1907, p. 67 only gives 4 localities, one of these mentioned above, the 3 others belonging to Tibetan territory; in 1923 he gives a list of Chinese localities, at the same time giving some extension to the original description.

In the Himalayan region *T. tibetanum* seems to be rare and confined

to the eastern part. In this respect it is the opposite of *T. kashmirensis*, which is restricted to the western part of the Himalayas. With regard to the occurrence of these two species North of the Himalaya I have no sufficient information.

Taraxacum wattii Hooker f., Fl. of British India 3 (1882) p. 402 (Fig. 24).

Area: Himalaya.

A more complete description than the very short one given by Hooker, seems to be necessary:

Planta elata 15–30 cm alta inferne araneosa; collum fragmentis foliorum veteriorum incrassatum.

Folia luteo-viridia saepe ± canescentia, glabra ad 10 cm longa purpureo-petiolata, late lanceolata vel obovata late vel anguste triangulariter lobata vel fortiter dentata; lobi laterales dorso dentati obtusi vel subacuti.

Scapi numerosi foliis aequilongi superne araneosi.

Involucrum crassiusculum campanulatum atro-viride 12–14 mm latum 12–13 mm longum. Squamae exteriores laxe adpressae vel apice ± recurvatae, ovatae acuminatae apice obtusae pro parte corniculatae emarginatae paulo ciliolatae.

Calathium planum radians luteum. Ligulae marginales planae extus stria cano-violacea ± notatae. Antherae polliniferae; stylus (± exsertus) et stigmata siccitate nigra.

Achenium (planta non typica!) dilute brunneum ca. 4,5 mm longum (pyramide inclusa) quinque costis spinulosis (interquas costis aspinulosis), in pyramidem 1,3 mm longam inconspicue abiens; rostrum ca. 7 mm longum; pappus albus ca. 6 mm longus.

In describing the achenes Hooker stated: "white compressed acutely ribbed, ribs sparingly echinate, beak stout shorter than the body, base conical" and "achenes not quite ripe, 1/4 in. long, silvery white". In the type material the achenes are unripe, and this explains Hooker's remark that the achenes are white and that the beak is stout and short. On the other hand his statement of echinate ribs is quite to the point. This character is found also in specimens belonging to *T. wattii* which were collected by Gammie in the Lachung valley, and which are present in h. DD.

Typus: Silundi, 3900 m, Pangee, X 1878, Watt 2741 (h. K), identified by HM as *T. alpinum*, see also HM 1907.

Furthermore:

Sikkim: Lachung valley, VIII 1892, Gammie (h. DD).

Uttar Pradesh: Tihri-Garhwal, Har-ki-dun, 3300 m, 10.9.1955, Sahmi (h. DD 21994).

—: Tihri-Garhwal, Kidarkauta, 6.10.1979, C. Singh 1162 (h. DD).

Chamba: Alwas, Δ Satrundi, 3150 m, 23.8.1896, Lace 1461 (h. DD).

—: between Alwas and Sach Pass, 3600–4200 m, 29.8.1896, Gammie (h. DD 18417).

Kashmir: Khellanmarg, 2850 m, 7.9.1960, Heybroek 18 a (h. v. S.).

- : between Gulmarg and Khellanmarg, 2800 m, 7.9.1960, Heybroek 18 c (h. v. S.); having the same white achene with thick rostrum as in the type specimen.
- : Kajinag, Hamalbasin, Jhelum, 2400–3600 m, 1–5.9.1907, Keshavanand 839 (h. DD).
- Punjab: Kanam, Kunawai, 30.8.1886, Drummond 25564 (h. K).
- Swat State: Batain above Ushu, 2700–3000 m, 28.7.1953, Stewart & Rahman 25385 pro parte (h. BM); verisimiliter.

Whereas the type material seems to have been collected rather late in the season, the five last items in this list represent plants in the earlier developmental stage.

X. SECT. CERATOPHORA DAHLSTEDT EX LINDMAN 1918; DAHLSTEDT 1928.

Taraxacum karakoricum v. Soest 1961, c. icon.

To the type locality, Lashi valley (also in h. L), two new localities can be added:

- Karakoram: Gharesa Glacier base camp, 13 m East of Nagar, earthy spots, Ablation valley lateral moraine, 4674 m, 7.8.1960, Polunin 6224 (h. BM); "flowers deep yellow".
- Ladakh: Kichick Kumdan Glacier, Shyok valley, 4950 m, grassy plots, 28.7.1929, Ludlow 574 pro parte (h. BM); verisimiliter: the big horns on the outer involucre bracts are little developed.

Taraxacum pseudo-stenoceras v. Soest 1961.

Area: Nepal!, Tibet!

Localities, in addition to the type locality:

- Nepal: Chule, 4350 m, 9.10.1955, Zimmermann, Exp. génév. 1603 (h. BM); a dwarf form with narrower leaves and side lobes than are found in the type material.
- Tibet: Tinki, 4500 m, stony turf, 13.7.1922, E. Monon (?) Mt. Everest exp. 354 (h. K); unripe achene brown; rostrum present; pappus white; flowers more or less tubular, "reddish orange".
- Tibet: Tibetan plateau, Shekar, 4350 m, alluvial soil in valley bed, 8.7.1924, Hingston, Mt. Everest Exp. 367 (h. K); the same characters as above; flowers "rusty red".
- : Lhasa, 3750 m, VII 1939, Richardson 255 (h. BM).

As indicated earlier (1961), this species is only provisionally included in sect. *Ceratophora*; it may be related to *T. sikkimense* HM, which differs from it by red achenes, by gibbositities in stead of horns on the involucre bracts, by whitish flowers and by non-tubular ligulas.

Taraxacum spiticum v. Soest spec. nov. (Fig. 33).

Planta sat robusta ca. 25 cm alta glabrescens.

Folia sublutescentia ad 15 cm longa lobata, petiolis subangustis rubro-violascentibus; lobi laterales utrinque 4 breves (ad 7 mm longi) lingulati, basin versus constricti patentes vel saepe retroversi, dorso raro 1 dente muniti; interlobiis latis (1–1,5 cm); lobus terminalis subhastatus subobtusus.

Scapi sub involucre paulo araneosi.

Involucrum crassiusculum ca. 15–18 mm latum ca. 17 mm longum pallide viride. Squamae exteriores lanceolatae ad 12 mm longae ad 3 mm latae vix conspicue pallide marginatae, apice purpurascens cornutae, interiores callosae vel corniculatae.

Calathium paulo radians ca. 2,5 cm diametro flavum (?); ligulae marginales planae extus roseolae. Antherae vacuae (?); stylus et stigmata lutea; floret Augusto.

Achenium (immaturum) brunescens large spinulosum, in pyramidem conico-cylindricam sat longam subabrupte abiens; rostrum sat longum; pappus albus ca. 6 mm longus.

Typus: Spiti: Kiber, 3900 m, in irrigation channels, 11.8.1933, Gill 2005 (h. DD), also in h. K.

Taraxacum staintoni v. Soest spec. nov. (Fig. 25).

Differt a *T. bicorne* Dahlst., cui valde simile est, his notis: Folia interiora magis dentata, exteriora patente lobata. Involucrum subcrassiusculum; squamae exteriores cornutae, interiores atropurpureo-callosae. Calathium radians ca. 4 cm diametro; ligulae marginales extus stria fusco-violacea notatae. Antherae polliniferae; stylus luteus, stigmata virescens. Achenium dilute brunneum ca. 3 mm longum (pyramide exclusa) large costato-spinulosum, in pyramidem subcylindricam 1,5 mm longam (spinulis interdum praeditam) subabrupte abiens.

Typus: Nepal: Chimgaon, N. of Tukucha, at edge of field, 2700 m, 3.6.1954, Stainton, Sykes & Williams 901 (h. BM).

Furthermore:

Central Nepal: Jamosum, 2850 m, 25.4.1961, H. B. Singh et al. 1573 (h. IARI, h. v. S.); also 1580 pro parte, a dwarf form.

—: forest above Pangi, 18.8.1847, Thomson (h. K), in HM 1907 as *T. indicum* HM; verisimiliter (v. S.).

XI. SECT. VULGARIA DAHLSTEDT EX LINDMAN 1918

Taraxacum duplidens Lindberg f., Acta Soc. p. Fau. et Fl. Fenn. 29.9. (1907) p. 38; icon.: Lid, Norsk Fl. 2 ed. (1952) fig. 383a; v. Soest, Acta Bot. Neerl. 4 (1955) fig. 13.

Area: northern Europe, southward to England, northern France and Germany!; introduced in India!

Localities:

Kulu: Manali, 1800 m, 21.6.1959, H. B. Singh & v. S.; plants grown in Delft Botanical Garden (c. 4, 5, 77) in h. v. S.; h. BLAT, BM, DD, K, LWG, MH, RAW, U; h. Saarsoo.

The stigmas are yellow; pollen is absent or, if present, sterile. According to Hou-Liu, the chromosome number of plants from Kulu, is $2n = 24$, which means that the species is triploid.

Taraxacum helianthum¹⁾ v. Soest **spec. nov.** (Fig. 26).

Planta 10–20 cm alta, inferne paulo araneosa.

Folia suberecta gramineo-viridia parce araneosa, petiolis angustis rufo-violaceis; lobi laterales utrinque ca. 4 triangulares acuti ad 12 mm longi dorso convexo dentati, margine inferiore subrecto; interlobiis ad 1 cm longis ca. 3 mm latis pro parte ± atro-violaceis, dentatis et denticulatis; lobus terminalis deltoideus 1–2(–2,5) cm longus integer subacutus, lobuli basales ad 1 cm longi subacuti vel acuti.

Scapi floriferi foliis subaequilongi sub involucri araneosi.

Involucrum subobscure viride. Squamae exteriores reflexo-patentes anguste ovatae vel late lanceolatae ca. 11 mm longae rufescentes vix conspicue marginatae vel emarginatae; squamae interiores ca. 15 mm longae.

Calathium planum radians ad 4 cm diametro obscure luteum. Ligulae marginales planae extus stria cano-violacea notatae. Antherae polliniferae; stylus et stigmata fusco-virescentia. Floret vere.

Achenium stramineum 4 mm longum (pyramide inclusa) superne dense sed breviter spinulosum ceterum rugosum, basi laeve, in pyramidem conico-cylindricam 0,8 mm longam subabrupte abiens; rostrum 7 mm longum; pappus albus 5–6 mm longus.

Typus: Kashmir: Srinagar, garden of Nedou's hotel, 23.5.1959, v. S. 117a; grown from achenes in Delft Botanical Garden (c. 17, 21–26, 102) in h. v. S.; h. BLAT, BM, DD, IARI, K, LWG, MH, RAW, U.

I do not know this form from Europe; *T. helianthum* may be nearly related to *T. dilatatum* Lindberg f. from there. It belongs without doubt to sect. *Vulgaria*; I believe that it is introduced in Kashmir.

According to Hou-Liu, the chromosome number of plants from Srinagar, is $2n = 24$, which means that the species is triploid.

Taraxacum insigne Ekman ex Dahlstedt, *Taraxaca Scandinavica Exsiccata III* (1913) 34, nomen; ex Raunkiaer, *Dansk Exk. Fl.* 5e ed. (1934), with short description; ex Marklund, *Acta Bot. Fenn.* 23 (1938) p. 60, as "ined."; ex v. Soest, *Bull. Brussel* 31 (1961) p. 327, c. icon., with short description; *T. insigne* Dahlstedt ex Haglund, *Botan. Notiser* (1934) p. 372; *Kew Index IX* (1931–1935), "in obs., nomen".

Observation: This species has apparently never been completely described, a situation which is not normal in the *Vulgaria*-species of N.W. European origin.

Area: N.W. Europe, from the British isles and the Low Countries eastward to southern Sweden and Esthonia!; introduced in the Darjeeling district!

Localities:

Darjeeling, grassy fields and along roads, 2120–2140 m, 2.5.1959, Mital & v. S. 8, 13, 14 (h); 12 (h, h. LWG); 15 (h, h. IARI); also grown from achenes

1) Srinagar, formerly was named Suryanagar and "surya" means: "sun".

- in Delft Botanical Garden (h. v. S.; h. BLAT, BM, DD, K, LWG, MH, RAW, U; h. Saarsoo).
 —: Lloyd Botanical Garden, in grass field, 2100 m, 1.5.1959, Mital & v. S. 6, 11 (h), also grown from plants in Delft Botanical Garden.
 —: Birch hill, 2140 m, 15.5.1959, Mital & v. S. 86 (h).

A rather extensive cultivation of the Darjeeling plants in the Delft Garden has convincingly shown their identity with the European plants.

According to Hou-Liu (8), the chromosome number of the Darjeeling plants, is $2n = 24$, which means that they are triploid.

Taraxacum javanicum v. Soest **spec. nov.** (Fig. 27).

Planta 10–15 cm alta sat robusta collo vix squamato.

Folia numerosa gramineo-viridia subtus canescentia araneosa, petiolis pallidis; lobi laterales utrinque 3–4 hamati obtusi vel subacuti ad 3 cm longi, inferiores dentati, superiores integri; interlobiis saepe brevis sublatis; lobus terminalis breve hastatus vel \pm deltoideus obtusus.

Scapi saepe numerosi sub involucro araneosi, floriferi foliis aequilongi vel breviores.

Involucrum pallide viride ca. 10 mm longum ca. 12 mm latum. Squamae exteriores reflexo-patentes vel recurvatae, lanceolatae ad 7 mm longae inconspicue pallide marginatae, omnes laeves.

Calathium subradians ad 2,5 cm diametro luteum. Ligulae marginales planae extus stria cano-violacea notatae. Antherae polliniferae; stylus et stigmata sordide lutea.

Achenium dilute brunneum ca. 4 mm longum (pyramide inclusa) superne spinulosum ceterum rugosum, basi laeve, in pyramidem conico-cylindricam ca. 1 mm longam (spinulis saepe praeditam) subsensim abiens. Rostrum 7–9 mm longum; pappus albus 5 mm longus.

Typus: Java; Western part: Tji Kadjan, southward of Garoet, tea garden, 1200 m, I. 1924, Beguin (h. L). Also: G. Mandalagiri, tea garden, 1500 m, I. 1924, Beguin (h. L).

Furthermore:

Java: banks at Chisirupan, base of G. Papandajan, 1915, Ridley (h. K), as *T. mongolicum* HM.

Observation: the plants have first been mentioned as *T. officinale* by Boerlage in Hand. 2e Ned. Natuur- en Geneesk. Congr. 1889; Backer has given as their local distribution: G. Tjikoraj, G. Papandajan, G. Mandalagiri and saddles in between, 1200–1500 m, grass fields, grassy road sides. Backer and v. Slooten give as the Sundanese name "djombang".

Already a long time ago I gave the name *javanicum* to this species, but hesitated to describe it as the material was not very satisfactory and as I did not succeed in growing the plants from achenes; now that I have seen a rather rich material from India, I did not hesitate any longer.

Madras: Salem district, Shevaroy, 11.5.1917, ... (h. MH).

—: Ooty, Nilgiris, 1.11.1942, Jacob (h. MH).

- : Nilgiris, 2100 m, VIII 1885, Gamble (h. K), identified by HM as *T. officinale*, see also HM 1907.
- : Ootacamund, 2250 m, 16.1.1951, Jain & Bharadwaja (h. DD 22703).
- : Coonoor, lower water course Rallia, 13.7.1896, Bourne (h. K).
- Bombay: Bombay Shola, Kodaikanal, 12.5.1959, Santapau (h. BLAT 23113).
- : Kodaikanal, 9.7.1897, Bourne 701 (h. K).
- Punjab: Kulu valley, Sissu Resthouse, 3000 m, grassy ground, 28.7.1954, Hackney (h. BLAT).
- Uttar Pradesh: Mussoorie, Capelitack (?) road, 2100 m, IV 1942, Naital (?) (h. DD). Finally: legit in Ind. or. L. B. de Hügel (herb. Zuccarini) in h. M, identified by HM as *T. indicum* (the name Hügel appears in HM 1907 as *exsiccata* 189, 826).

This species is reminiscent of *T. hamatum* Raunk. from Europe; the outer involuclral bracts are different, in the latter species they are more erect, not pale green; however summerforms of *T. hamatum* may show the aspect of *T. javanicum*. There is, nevertheless, a really important difference: the pyramid of the achenes is short and conical in *T. hamatum* and much longer in *T. javanicum*. For this reason *T. javanicum* might be allied to the species of sect. *Parvula* HM em. v. S. The description of *T. indicum* HM, as given by HM 1907, excludes the identity of *T. indicum* and *T. javanicum*: *T. indicum* always has obovate leaves with a rather acute apex and the involuclral bracts always have small horns, which are absent in *T. javanicum*, the outer involuclral bracts are always more or less appressed to the involucre and are rare distinctly marginate. HM's statement: "in regionibus humilioribus ad pedes occid. m. Himalaya", agrees more or less with the distribution of *T. javanicum*, but the material of *T. indicum* that I have seen is, in every case quite distinct from *T. javanicum*.

***Taraxacum kjellmaniiforme* v. Soest spec. nov. (Fig. 28).**

Planta 5–15 cm alta subrobusta.

Folia numerosa cano-viridia utrinseque 3–5-lobata, in nervo dorsali araneosa, petiolis subalatis pallidis vel parum roseolis. Lobi laterales anguste triangulares pro parte falcati, ad 1,5 cm longi retroversi acutissimi saepe mucronulati interdum dorso valde sublonge dentati saepe undulato-plicatuli; interlobiis ad 1 cm longis undulatis denticulatis vel dentatis; lobus terminalis indeterminato-sagittatus saepe inciso-dentatus vel sublobulatus, casa quo lobulis basalibus retroversis acutissimis, lobulo apicali acuto.

Scapi saepe numerosi subcrassi, floriferi foliis saepe breviores, araneosi.

Involucrum crassiusculum ad 14 mm longum ad 20 mm latum pallide rufo-viride. Squamae exteriores laxe adpressae, nunc apice recurvatae, nunc erecto- vel reflexo-patentes, ovato-lanceolatae ad 10 mm longae ad 3,5 mm latae late marginatae (ad 1 mm), omnes apice purpurascetes vel violaceae, laeves.

Calathium paulo radians ad 3 cm diametro luteum. Ligulae marginales planae extus stria cano- vel rufo-violacea notatae. Antherae polliniferae; stylus et stigmata sordide lutea siccitate subnigra. Floret junio.

Achenium stramineum 4 mm longum (pyramide inclusa) superne breviter spinulosum ad tuberculatum ceterum laeve, in pyramidem conicam brevam (0,5 mm longam) subabrupte abiens. Rostrum 6 mm longum; pappus albus 4,5 mm longus.

Typus: Kashmir: Khellanmarg, 3000 m, 3.6.1959, H. B. Singh & v. S. 283 (h, h. DD, LWG, U).

Furthermore:

Kashmir: between Gulmarg and Khellanmarg, 2850 m, 3.6.1959 H. B. Singh & v. S. 286 (h); Gulmarg, 1.6.1959, v. S. 204 (h. h. LWG).

Chenab valley: Agris, 2400 m, 30.6.1881, Eller (or Ellis, see HM 1907) 1513 (h. K), identified by HM as *T. officinale*.

The achenes of this species have a very short pyramid and in this respect they are like those found in the species of sect. *Vulgaria* Dahlst.; the fact that the outer involucre bracts are recurved at the apex is also in agreement with the supposition that it belongs to this section. Still there seems to be a certain relationship to sect. *Kashmirana* v. S., especially with *T. gulmargense* v. S., e.g. in the shape of the involucre. The leaves are reminiscent of those of *T. kjellmanii* Dahlst. (sect. *Vulgaria*), which is found in Europe and northern America.

Taraxacum polyodon Dahlstedt, Ark. f. Bot. 9.10 (1910) p. 56; icon.: v. Soest, Bull. Brussel 31 (1961) fig. 42 A, B.

Area: northern Europe, southward to England, northern France and central Germany!; introduced in Kashmir!

Localities:

Kashmir: Srinagar, garden of Nedou's hotel, 23.5.1959, v. S. 117 (h, h. LWG), 133 (h); also grown from achenes in Delft Botanical Garden (c. 91, 112).

The plants collected in 1959, showed the "status aestivalis", in which most species of the *Vulgaria* are extremely difficult to identify; cultivated plants, however, show the typical characteristics: e.g. reddish outer involucre bracts and leaves with densely dentate lobes.

Taraxacum subundulatum Dahlstedt, Rep. Bot. Exch. Club British Isl. f. 1922 (1923) p. 779.

Area: northern Europe, southward to England, the Netherlands and northern Germany!; introduced in Java!

Though this species does not belong to the Indian Flora, it may be mentioned here; it has been collected in Java. Achenes were sent over to me by Mr. Neervoort, informing me that the plants, now growing in Tjibodas Botanical Garden, were cultivated from plants collected at Garoet by Docters v. Leeuwen, 1925. The achenes, received in 1949, produced abundant material; cultivation showed the identity to *T. subundulatum*. Later on, the same species was collected by v. Oostroom 13893: Tjibodas, 1400 m, 2.5.1950 (h. L).

Besides *T. javanicum* and *T. subundulatum*, another species belonging to the *Vulgaria* has been collected in Java, viz. at Pengalengan in 1949, by v. d. Pijl; plants raised from achenes collected in this locality, have

been grown by me in the Delft Botanical Garden (1950–1953); I have not yet been able to identify this species.

Taraxacum violaceo-maculatum v. Soest **spec. nov.** (Fig. 29).

Planta 10–15 cm alta.

Folia numerosa ca. 12 cm longa subcanescentia parce vel modice violaceo-maculata, supra parce, subtus modice, in nervo dorsali densiuscule araneosa, petiolis angustis araneosis, nervoque mediano praesertim parte inferiore vinoso-colorato. Folia exteriora lanceolata lobata; lobi laterales angusti; lobus terminalis elongato-hastatus ad 3 cm longus subobtusus. Folia interiora utrinseque ca. 4-lobata, lobi laterales subfalcati acutissimi dorso interdum paulo denticulati; interlobiis angustis (1–2 mm) ca. 10 mm longis; lobus terminalis sagittatus vel elongato-hastatus saepe incisus vel sublobulatus, lobulo apicali elongato late lineari subobtusulo mucronulato.

Scapi numerosi arcuati foliis subaequilongi subdense, sub involuacro densissime araneosi.

Involucrum mediocre 13 mm longum ca. 13 mm latum rufo-viride. Squamae exteriores reflexae lanceolatae ca. 9 mm longae 3 mm latae angustissime albo-marginatae, interiores late lineares membranaceo-marginatae, omnes laeves.

Calathium planum radians ad 3 cm diametro luteum. Ligulae marginales planae extus stria rufo-violacea notatae. Antherae polliniferae; stylus et stigmata sordide lutea, virescentia. Floret maio-junio.

Achenium stramineum ca. 4 mm longum (pyramide inclusa) superne argute spinulosum ceterum rugosum, basi laeve, in pyramidem conico-cylindricam 1 mm longam (spinulis saepe praeditam) sensim abiens. Rostrum ca. 7 mm longum; pappus niveus ca. 6 mm longus.

Typus: Kashmir: Gulmarg, 2600 m, 1.6.1959, v. S. 213 (h. h. LWG).

In general this species resembles species of the *Vulgaria*-section. The achenes, the body of which is gradually elongated into the pyramid are exceptional for the latter.

The violet spots on the lamina of the leaf are also quite remarkable. This character is a rare one in *Taraxacum*, though fairly common in sect. *Spectabilia* Dahlst.; species belonging to this section which are provided with spotted leaves, are known from northern and western Europe. Furthermore spotted leaves occur in *T. gallicum* v. S. (sect. *Ceratophora* Dahlst.) from the W. Alps and in *T. lanigerum* v. S. (sect. *Calanthodia* Dahlst.) from Tibet; *T. violaceo-maculatum* has no relationship to any of these species or sections.

XII. SPECIES INCERTAE SEDIS

Taraxacum aurorum v. Soest **spec. nov.**

Planta 8–12 cm alta basi fragmentis foliorum veteriorum paulo incrassata, inferne araneoso-pilosa.

Folia ca. 10 cm longa cano-viridia glabrescentia linearia vel lanceo-

lata acuta \pm remote retroverso-lobulata (lobi laterales dorso interdum denticulati) vel grosse retroverso-dentata, petiolis pallidis.

Scapi ca. 2 araneosi denique glabrescentes.

Involucrum 15 mm longum ca. 15 mm latum crassiusculum. Squamae exteriores adpressae ovatae ad 7 mm longae latissime albo-marginatae ceterum atro-virides, omnes laeves vel minute callosae.

Calathium radians ca. 3 cm diametro flavum. Ligulae marginales angustae planae extus roseolae stria atro-purpurea notatae. Antherae polliniferae; stylus (exsertens) et stigmata siccitate nigra. Floret aestate.

Achenium dilute fulvo-brunneum parvum ca. 4 mm longum (pyramide inclusa) superne spinulosum ceterum rugosum, basi laeve, in pyramidem conicam 0,5 mm longam abrupte abiens. Rostrum ca. 7 mm longum; pappus albus 6 mm longus.

Typus: Lahul: Serchu, dryest slopes, 3900 m, 30.6.1941, Bor 15115 (h. RAW).

Furthermore:

Kashmir: Sonamarg, 3600 m, 28.7.1928, Stewart 9806 a, pro parte (h. RAW) (co-type).

For the description plants of both localities had to be used. *T. aurorum* might, according to the achenes, be referred to sect. *Tibetana* v. S., but the involucre bracts suggest a relationship to sect. *Orientalia* HM. This species might be related to *T. porphyranthum* Boissier, known from the Caucasus and Turkestan! (and Tibet, according to HM 1923).

T. aurorum might be compared to *T. nepalense* v. S., *T. nasiri* v. S. and *T. stewartii* v. S. *T. nepalense* is easily distinguishable by the styles and stigmas, which are never black, *T. nasiri* by its smooth white pappus, whitish achenes and very narrow outer involucre bracts, *T. stewartii* by its smooth white pappus and lanceolate, nearly emarginate outer bracts.

***Taraxacum bhutanicum* v. Soest 1961, c. icon.**

Area: Himalayan region!

To the type locality can be added:

Nepal: C. Nepal, Ghaza, Pine forest, 1800 m, 21.4.1961, H. B. Singh et al. 1521, pro parte (h. IARI, h. v. S.), stigmas yellow.

.....: Mardali, grassy slopes, 2100 m, 16.4.1938, Bor (h. DD).

Pakistan: Abbotabad, Hazara, 1500 m, 8-11.4.1927, Stewart 9009 (h. RAW).

In general appearance *T. bhutanicum* resembles *T. dissectum* Ledebour: the outer involucre bracts have a very wide margin, its width reaching; one third or even more of the total width. In general appearance these two species differ from the species of sect. *Kashmirana* v. S., reason why I have not included them in that section. *T. dissectum* is a species occurring in the chain of high mountains extending from the Altai westward to the Pyrenees. For the moment the question whether these two species constitute a section different from the *Kashmirana*, will be left undecided.

Taraxacum fedtschenkoi v. Handel-Mazzetti 1907.

Area: Turkestan!

Probably this species has also been collected in the Kurram valley Pakistan: Nalana Tangi, 1.5.1894, Haronkh (h. DD 14925). Though the material is not easily identifiable as no achenes are available, it looks as if it belongs to this species.

Taraxacum glaucanthum (Ledebour 1829) De Candolle 1838; icon.: HM 1907.

Area: Russia!, into Asia eastward to Turkestan!; probably in Pakistan and Tianshan!

The material mentioned below is poor, and I am giving the localities with some mental reservation.

Beluchistan: Tandwani, 20.5.1956, Dick-Peddie 53 a (h. RAW).

Baltistan: near Skardo, 2070–2250 m, 4.8.1856–4.9.1856, Schlagintweit 856, as *T. palustre* (h. BM), identified by HM as *T. bessarabicum* (Fisch.) DC, but not mentioned under this name in HM 1907. The number is quoted under *T. indicum* HM and said to be present in h. St. Petersburg, now h. LE.

T. glaucanthum is regarded by HM 1907 as belonging to sect. *Scariosa*, which, in my opinion, is probably a mistake.

Taraxacum heteroloma v. Handel-Mazzetti 1907, c. icon.

HM p. 120 describes and figures two quite different shapes of achenes; other characters mentioned in the description are also wide variable. He discusses this matter shortly on p. 121, and states that this species nevertheless is always easily recognizable by its habit. Dahlst. 1926 discusses the matter once more and splits off *T. maurocarpum* Dahlst. (c. icon.), a species with nearly black achenes, not known from the Himalayan region. I myself recognized among the specimens identified by HM *T. apargiaeforme* Dahlst. (see under sect. *Tibetana* v. S.).

Even among what is left, there is a considerable heterogeneity; for example, the specimens from Gyantse (Tibet), Walton, 1904 (h. K, M) and those from W. Tibet, Falconer 3647 (h. K) surely represent two different species of which one might be *T. heteroloma* s. str.; as the exact situation of the latter locality, although belonging to the area of the Himalayan Flora, is very vague, I will abstain from a further discussion.

Taraxacum hoofitii v. Soest 1961, c. icon.

Area: Kashmir!, Pamir?, Tianshan?

A new locality can be added: Kashmir: Kishtwar, N.E. of Murgan Pass, 2700–3300 m, de la C. Fuller 12 (h. K).

At an earlier occasion I suggested that this species from the Karakoram might be related to sect. *Calanthodia* Dahlst., but this is quite uncertain; compare *T. xanthophyllum* Hagl. below.

Taraxacum nagaricum v. Soest **spec. nov.** (Fig. 30).

Planta parva 3–5 cm alta, basi valde araneosa fragmentis foliorum veteriorum incrassata.

Folia decumbentia 3–6(–12) cm longa obscure gramineo-viridia lobata dorso (in nervo mediano dense) araneosa, petiolis brevis angustis; lobi laterales lineares vel subfalcati acuti ad 8 mm longi patentes vel paulo retroversi, dorso et margine inferiore lobi interdum 1 dente parvo munito; interlobiis 1 mm latis ca. 3–8 mm longis dentatis vel denticulatis; lobus terminalis in foliis exterioribus elongatus ca. 2(–4) cm longus subobtusus, lobulis basalibus retroversis, in foliis interioribus brevior subsagittatus.

Scapi 2–3 araneosi.

Involucrum mediocre angustum 10 mm longum ca. 8 mm latum basi rotundatum obscure viride. Squamae exteriores parvae laxae adpressae imbricatae 3–5 mm longae ad 2,5 mm latae, ovatae vix-conspicue marginatae ciliolatae apice purpureae, pro parte minute callosae.

Calathium 2,5 cm diametro luteum. Ligulae marginales planae extus stria cano-purpurea notatae, summo nigrae. Antherae polliniferae; stylus et stigmata (siccitate) nigra. Floret aestate.

Achenium roseo-fulvum 5 mm longum (pyramide inclusa) superne breviter sed late squamulosum, in pyramidem conicam 0,7 mm longam abrupte abiens; rostrum angustum 4,5–5,5 mm longum; pappus sordide albus 5 mm longus.

Typus: Nagar State: Minapin Glacier: gravel patches, standing higher than surrounding silty areas liable to occasional flooding, grazed, 3450 m, 21.8.1961, Lloyd & Megan 91 (h. BM) and no. 90.

Also: same area, altitude and collectors: slope facing south-east (33°), intensively grazed, 7.8.1961, no. 38 (the achenes of this specimen have been used for the description); leaves longer (up to 12 cm including petiole), with long terminal lobe (4 cm) and less dark green; slope facing north, intensively grazed, 7.8.1961, no. 40 (all h. BM).

This interesting species seems to occupy an intermediate position in our classification of the sections. Blackish styles and stigmas and rather dark involucre point into the direction of the *Tibetana* v. S. The small outer involucre bracts and the rather dense indument of araneous hairs found on the leaves remind us of sect. *Oligantha* v. S.

Taraxacum nepalense v. Soest 1961, c. icon.

Area: Nepal!

A specimen bearing the same number as the type material in h. BM is present in h. DD: Khaptar forest, 1929, Bis Ram 505. Furthermore, *T. nepalense* has been collected at Tarakhola, W. of Beni, in open grass amongst forest, 2700 m, 25.4.1954, Stainton, Sykes & Williams 197 (h. BM).

It is still uncertain to which section *T. nepalense* belongs; it seems to be related to *T. hoofitii* v. S. and *T. xanthophyllum* Hagl., see below.

Taraxacum sherriffii v. Soest 1961; Fig. 31 in this paper.

Area: Tibet!, Karakoram!

To the type locality in Tibet a new locality can be added: Karakoram: 3150 m, 14.8.1876, Clarke 30475 (h. BM), identified by HM as "*T. parvulum* (Wall.) DC—*pseudonigricans* mih. *pl. intercedens*"; in HM 1907 p. 48 the locality is mentioned under *T. dissectum* Ledeb. (according to HM identical to *T. parvulum*). At p. 52 (under *T. pseudonigricans* HM) he mentions: "Bezüglich der indischen Exemplare ist mir in neuester Zeit beim Studium des *T. dissectum* immer mehr der Verdacht aufgestiegen, dass es sich nur um stark veränderte Exemplare der letzt genannten Art handelt; leider steht mir das Material nicht mehr zur Verfügung".

T. pseudonigricans does not belong to the Himalayan Flora, furthermore, I am sure that the above mentioned specimens do not belong to sect. *Parvula* HM sens. lat.

In the type material no ripe achenes are present; as the Karakoram plants have achenes I can additionally give a description of these; the extremely long pyramid is remarkable:

Achenium (co-typi!) stramineum 5 mm longum (pyramide inclusa) superne fortiter erecto-vel patent spinulosum ceterum tuberculatum, in pyramidem cylindricam 1,8 mm longam (spinulis saepe praeditam) subabrupte abiens. Rostrum 6 mm longum; pappus albus 6-7 mm longus.

Taraxacum staticifolium v. Soest 1961.

Area: Tibet!, Kashmir?

Plants collected by Stewart: Kashmir: Burzil Chowki, 3300 m, 26.7.1940 (h. RAW 19770) are similar to those of Tibet, differing only from the latter by darker coloured stigmas and less dark involucre; the ligulas seem to have a pale yellow colour; the plants have the same leaf form, the same shape of involucre, outer bracts of the same shape, the same pink colour of the petioles; the Kashmir plants too lack pollen.

T. staticifolium seems to occupy an intermediate position between sect. *Orientalia* HM and sect. *Tibetana* v. S. As no achenes were available, a decision could not yet be reached. It resembles *T. pseudostenolepium* in sect. *Tibetana*, but it differs from the latter in leaf form (the leaves being nearly linear and scarcely dentate), by less dark stigmas and involucre, by the lack of pollen, and by the absence of gibbositities on the outer involucral bracts.

Taraxacum xanthophyllum Haglund 1938, c. icon.

Area: Kashmir!; apart from the type locality (Baltit Hunza) no other localities are known.

Haglund suggests a relationship with *T. alpinum* (Hoppe) Heg. et Heer; this is in my opinion not justified as, though the rostrum is rather short, the outer involucral bracts are quite different from those

in sect. *Alpina* Hagl.; in this section they are much longer than in *T. xanthophyllum*, furnished with small horns and the achenes are moreover provided with a narrow pyramid.

On the other hand, hardly be denied that it resembles *T. hoofstii* v. S. and *T. nepalense* v. S. However, it seems premature to create for these species a new section.

SUMMARY

The *Taraxacum* flora of the Himalaya is revised; 75 species are mentioned of which 40 are new; moreover, a few subspecies and forms are described. Of the 75 species 64 could be referred to 11 different sections, of which 5 are new; for 11 species no section could yet be indicated, partly on account of the absence of achenes or because the latter are but imperfectly known.

The western Himalaya especially is rich in *Taraxacum* species. Great differences occur between the western and eastern parts, and also between the northern and southern ones. Very few *Taraxacum* species descend into the lower regions and into plains situated at an altitude of less than 1800 m.

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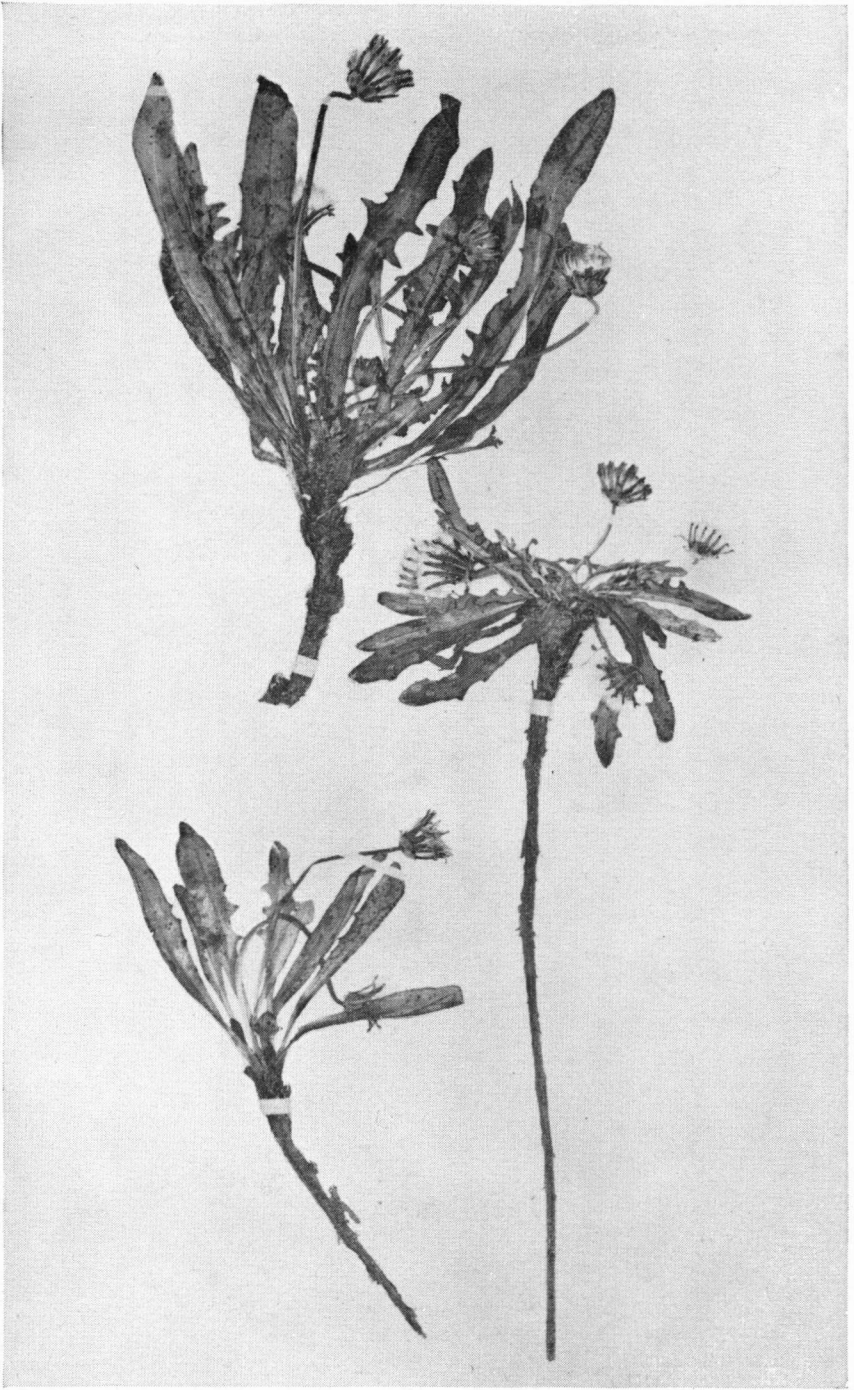


Fig. 5. *T. chitralense*



Fig. 6. *T. tazzei*

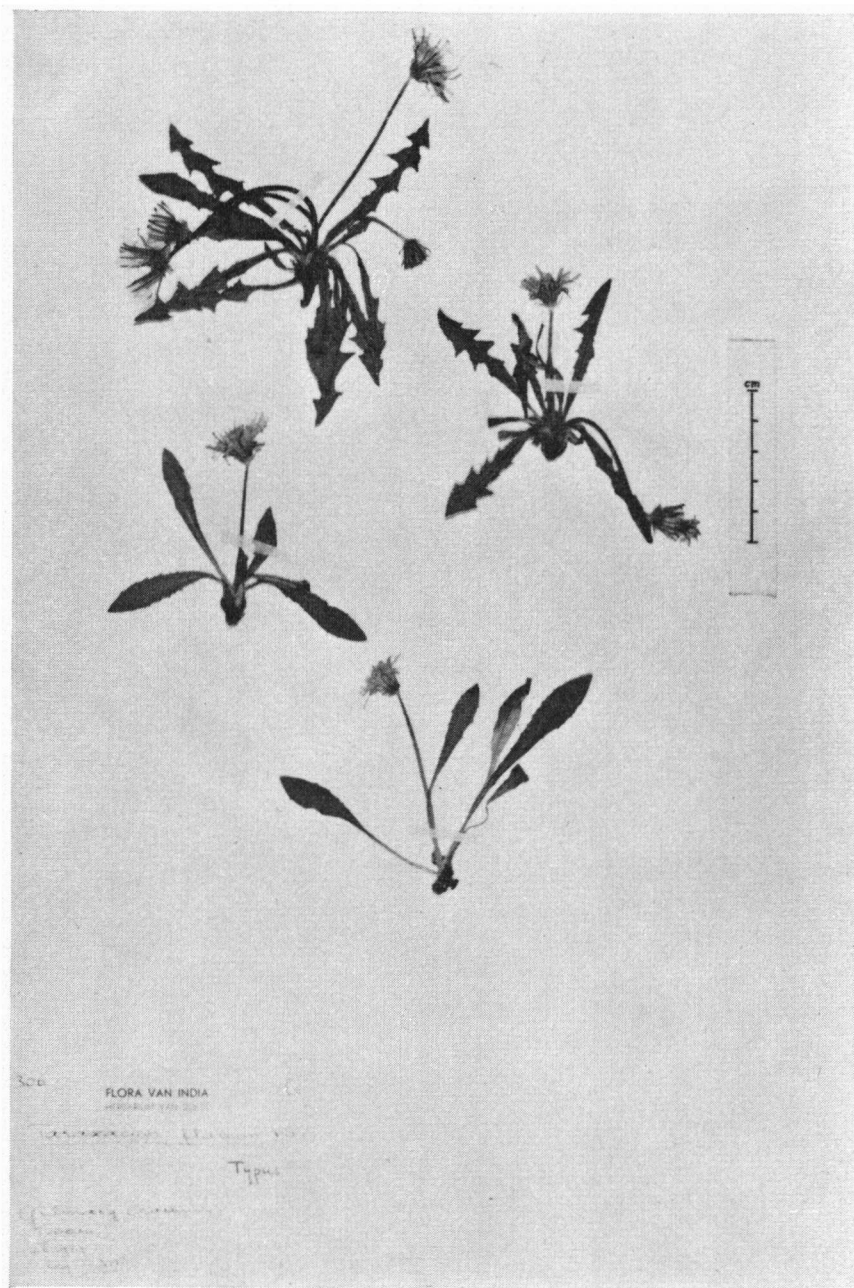


Fig. 7. *T. flavum*

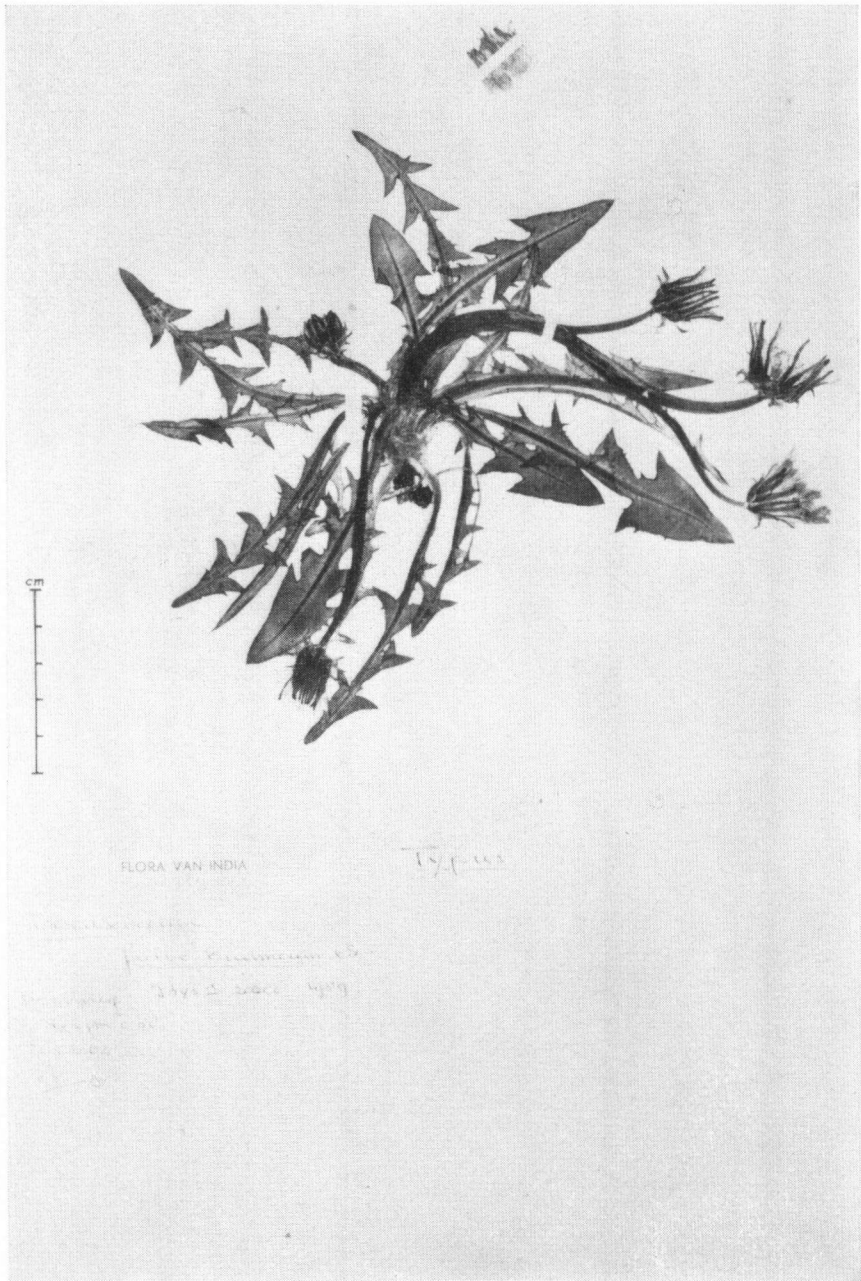


Fig. 8. *T. fulvo-brunneum*

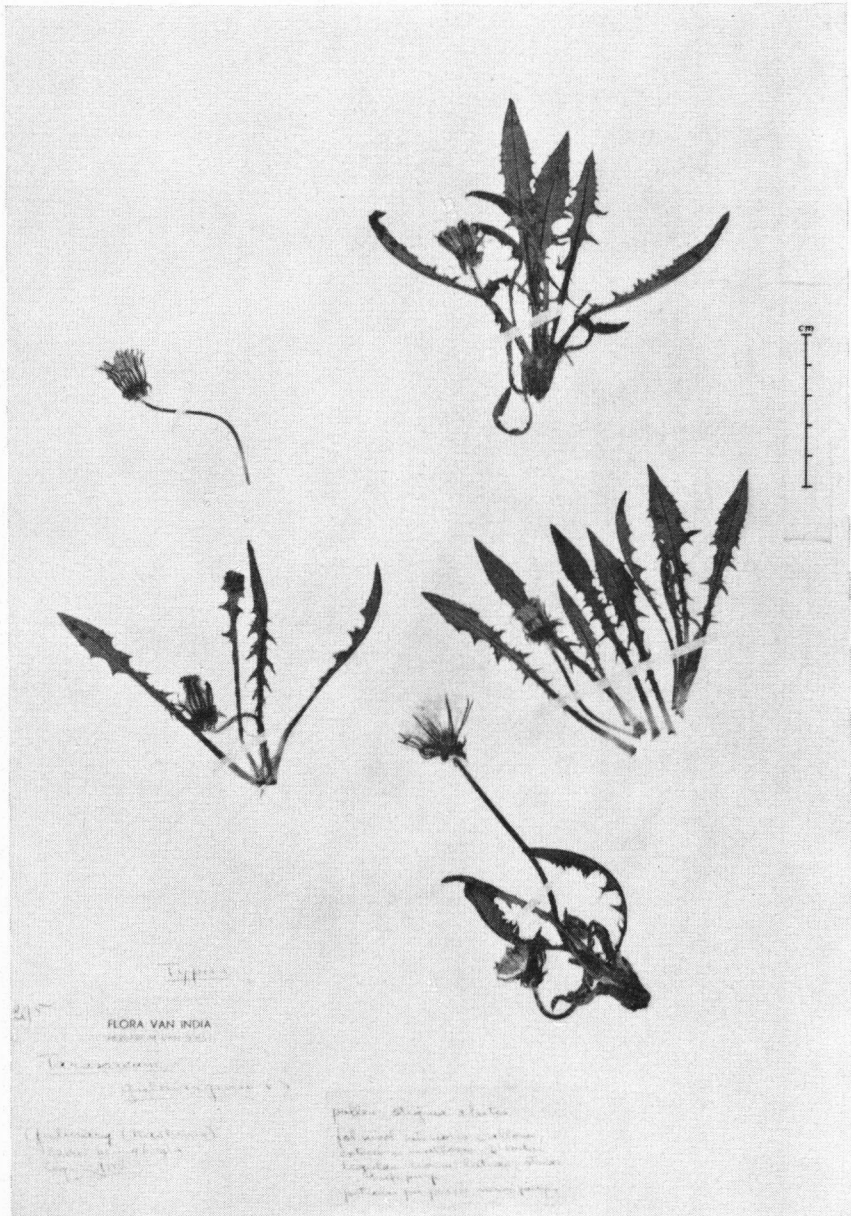


Fig. 9. *T. gulgargense*

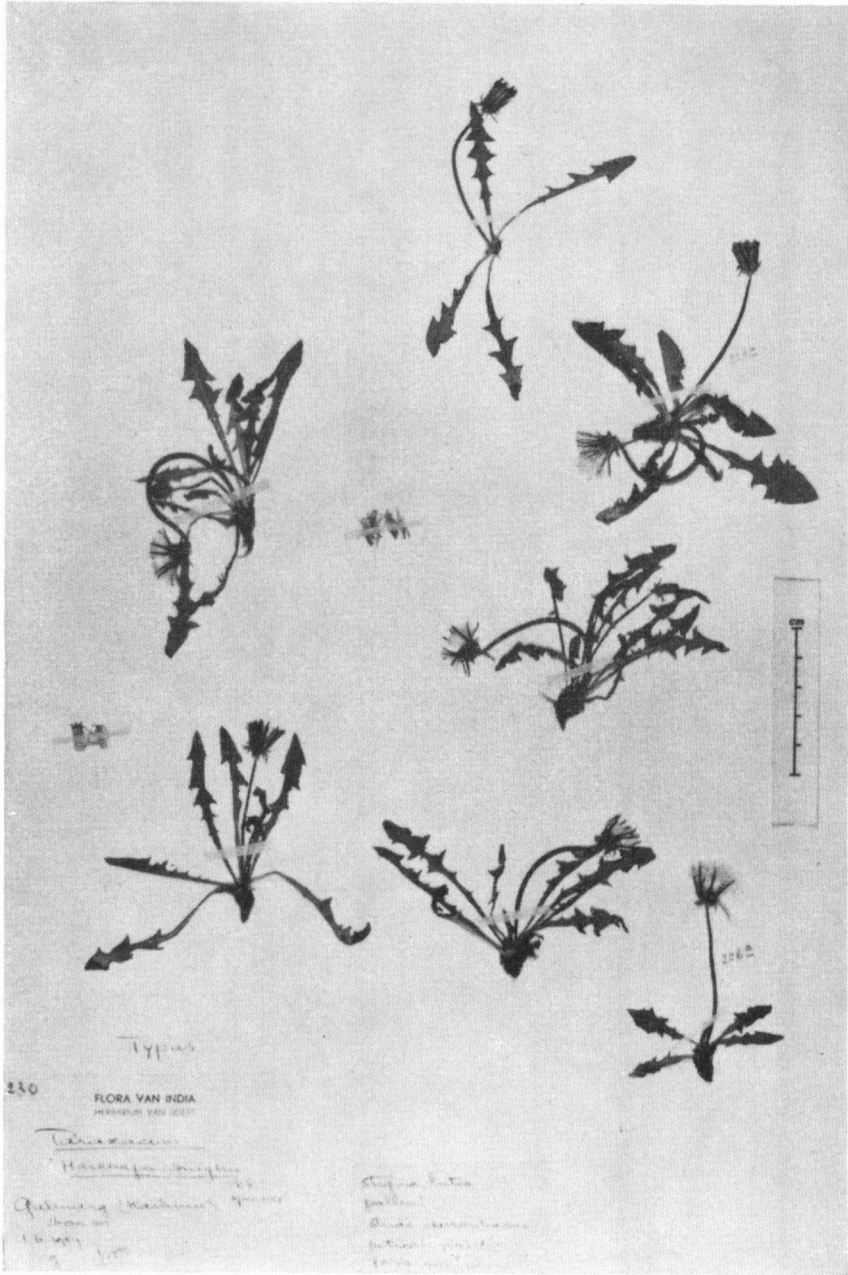
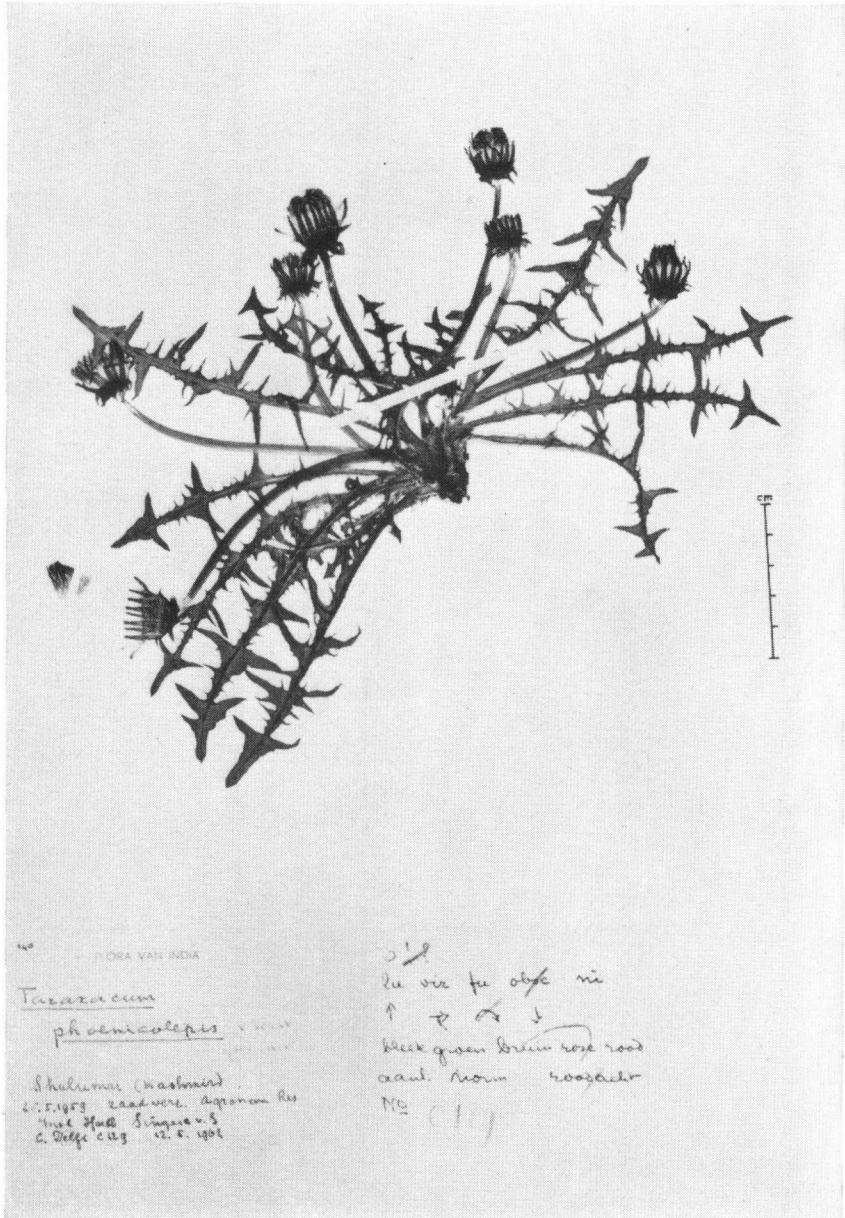


Fig. 10. *T. harbhajan-singhii*



Fig. 11. *T. harbhajan-singhii* ssp. *pahalgamense*

Fig. 12. *T. phoenicolepis*

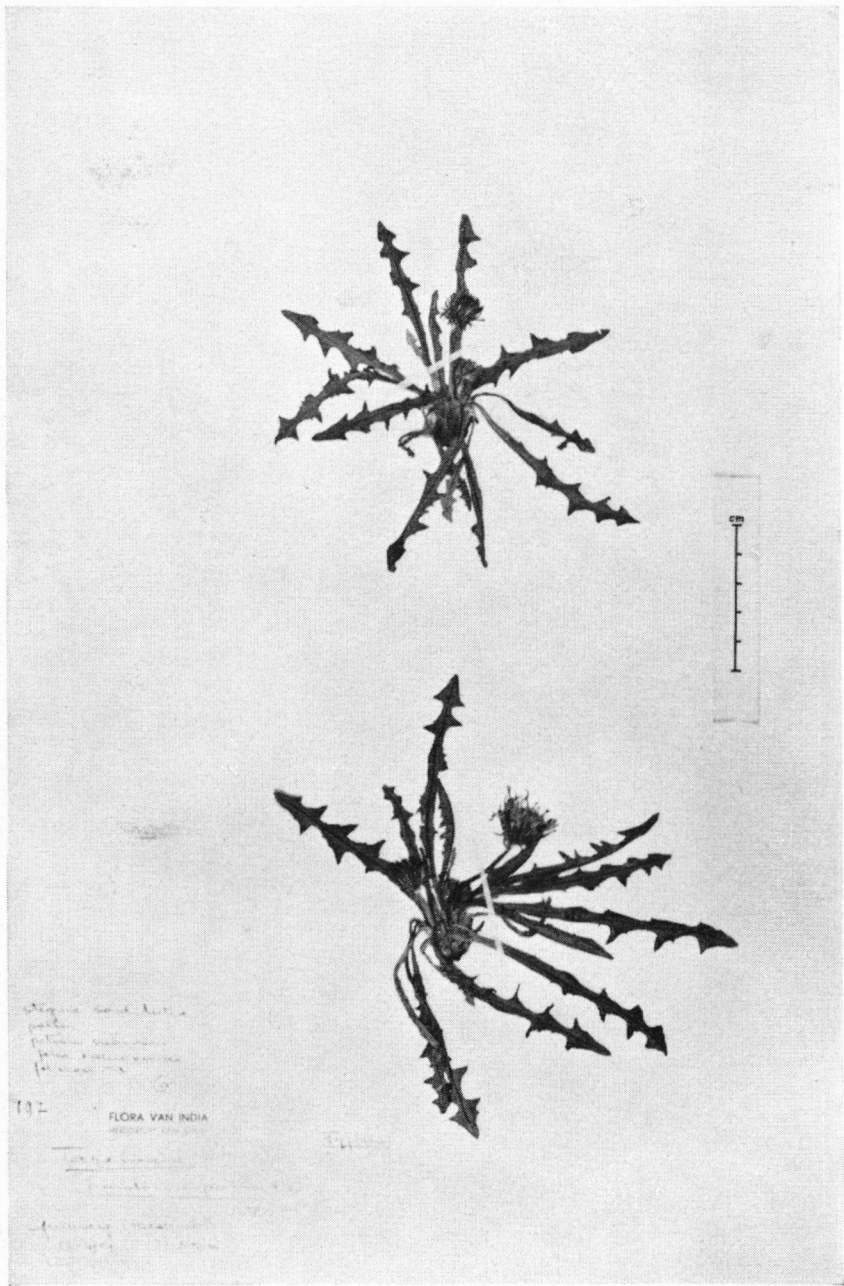


Fig. 13. *T. pseudo-eripodum*



Fig. 14. *T. tenebristylum*

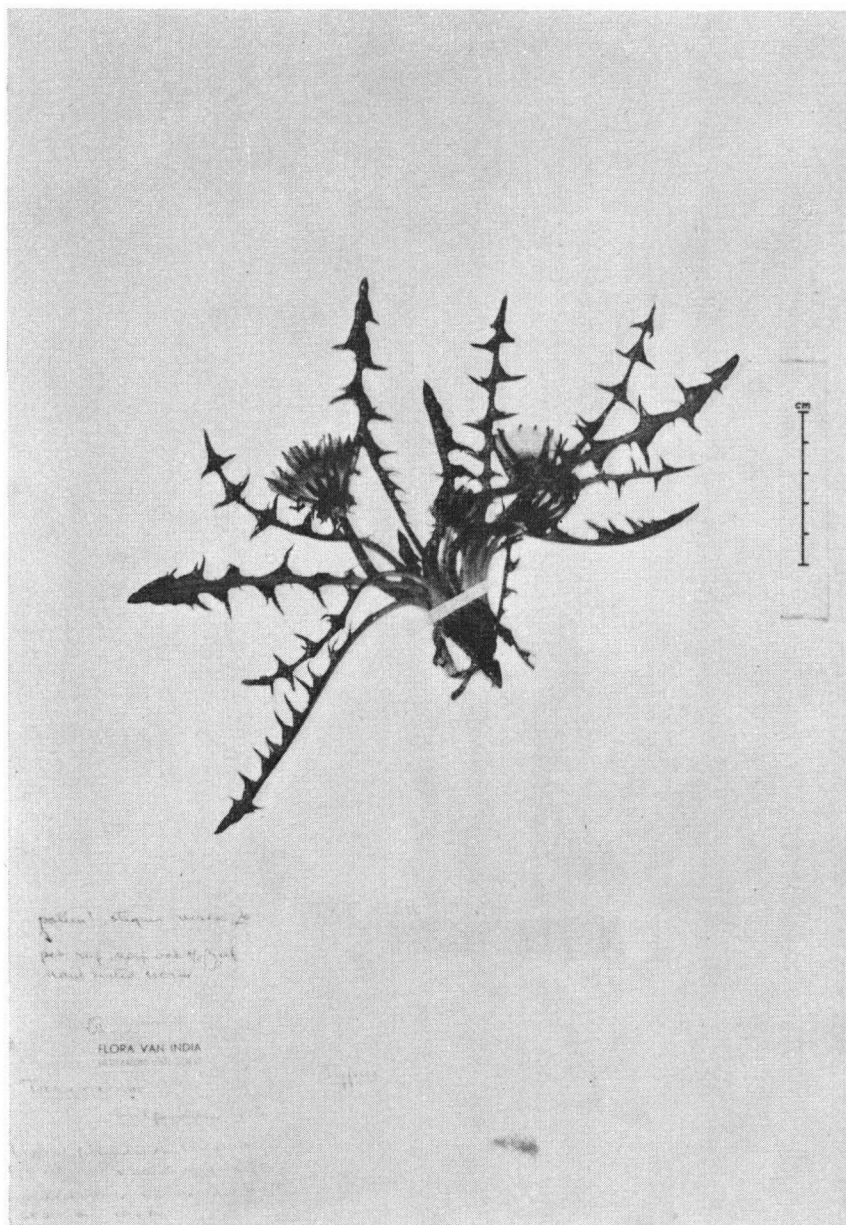


Fig. 15. *T. vulpinum*

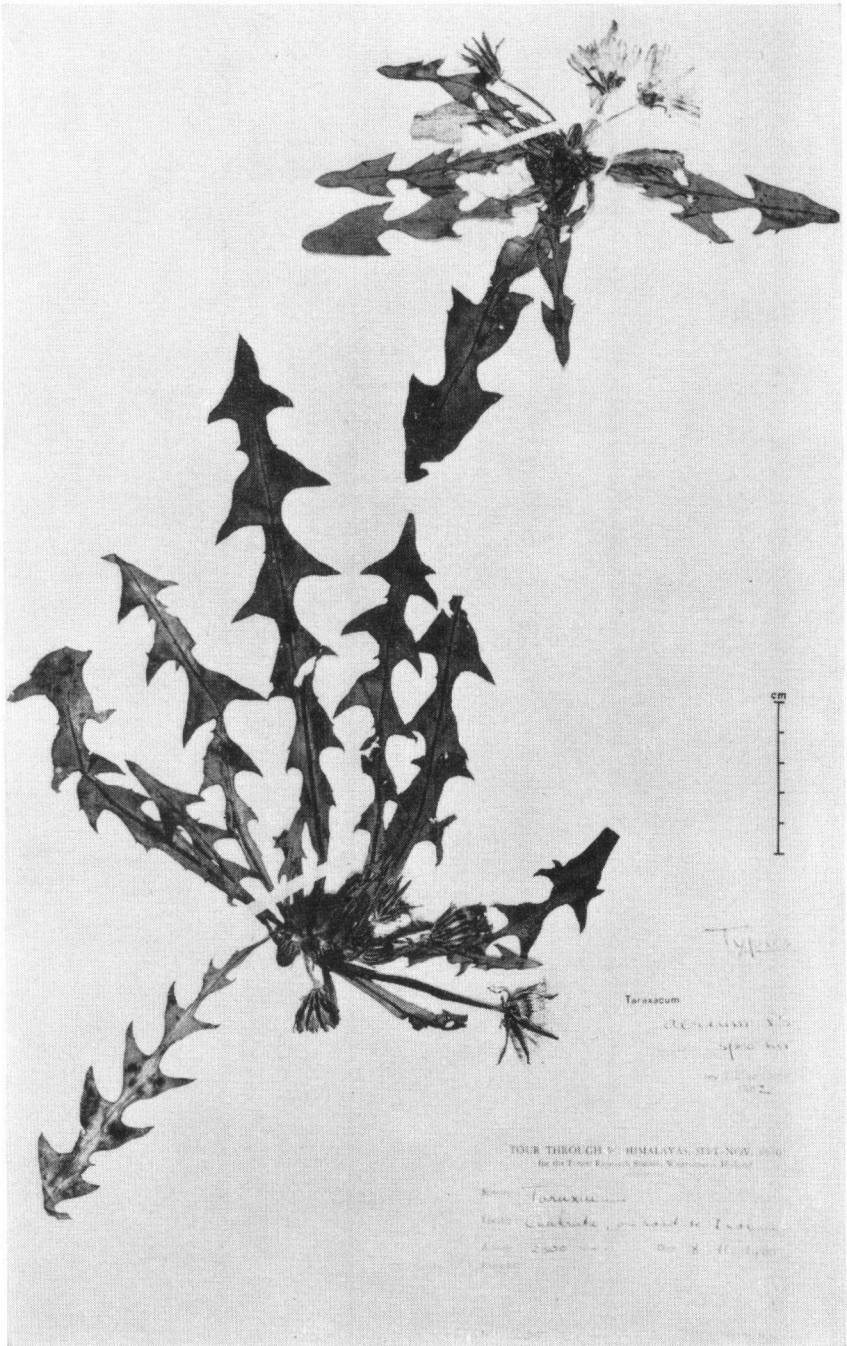


Fig. 16. *T. aereum*

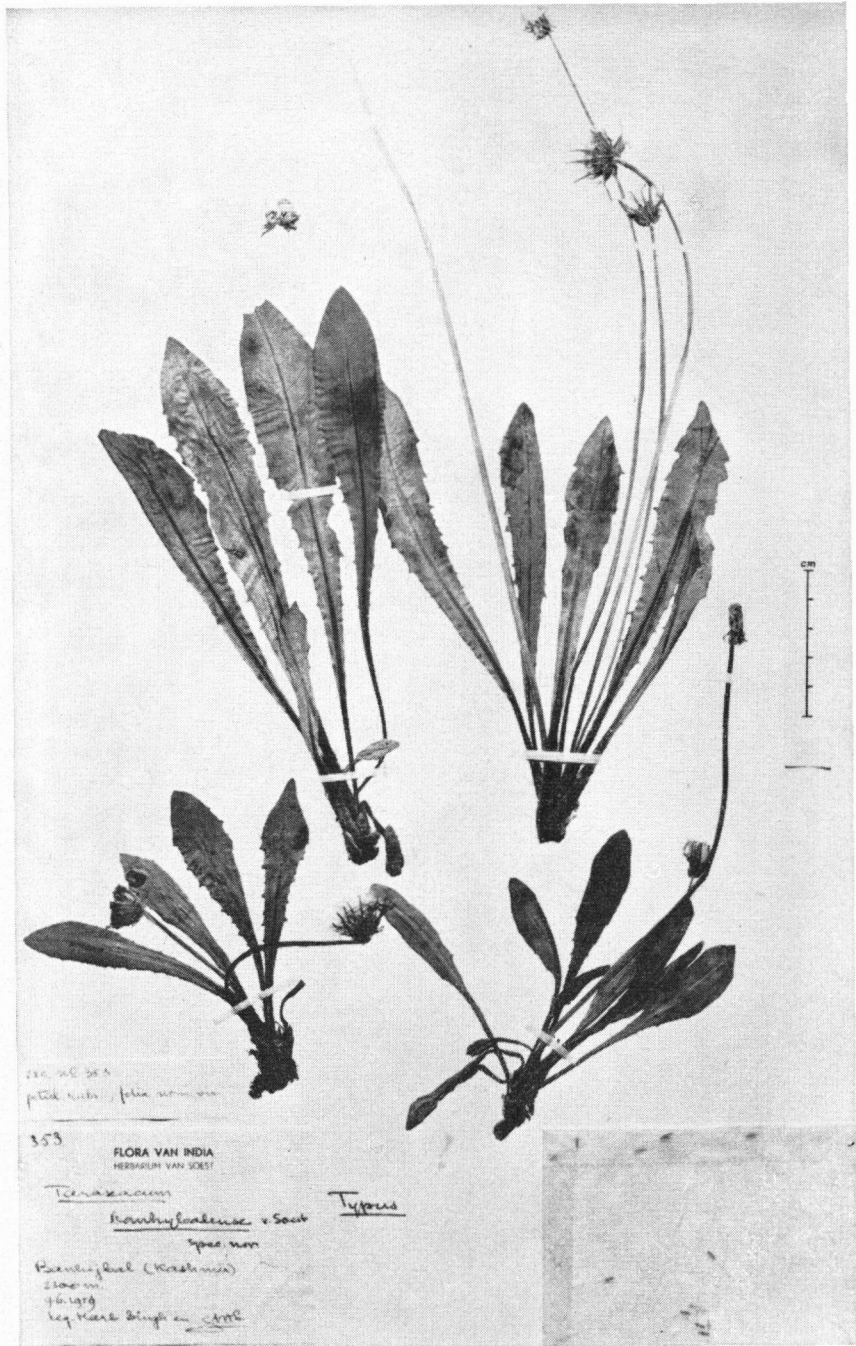


Fig. 17. *T. bankhyalense*

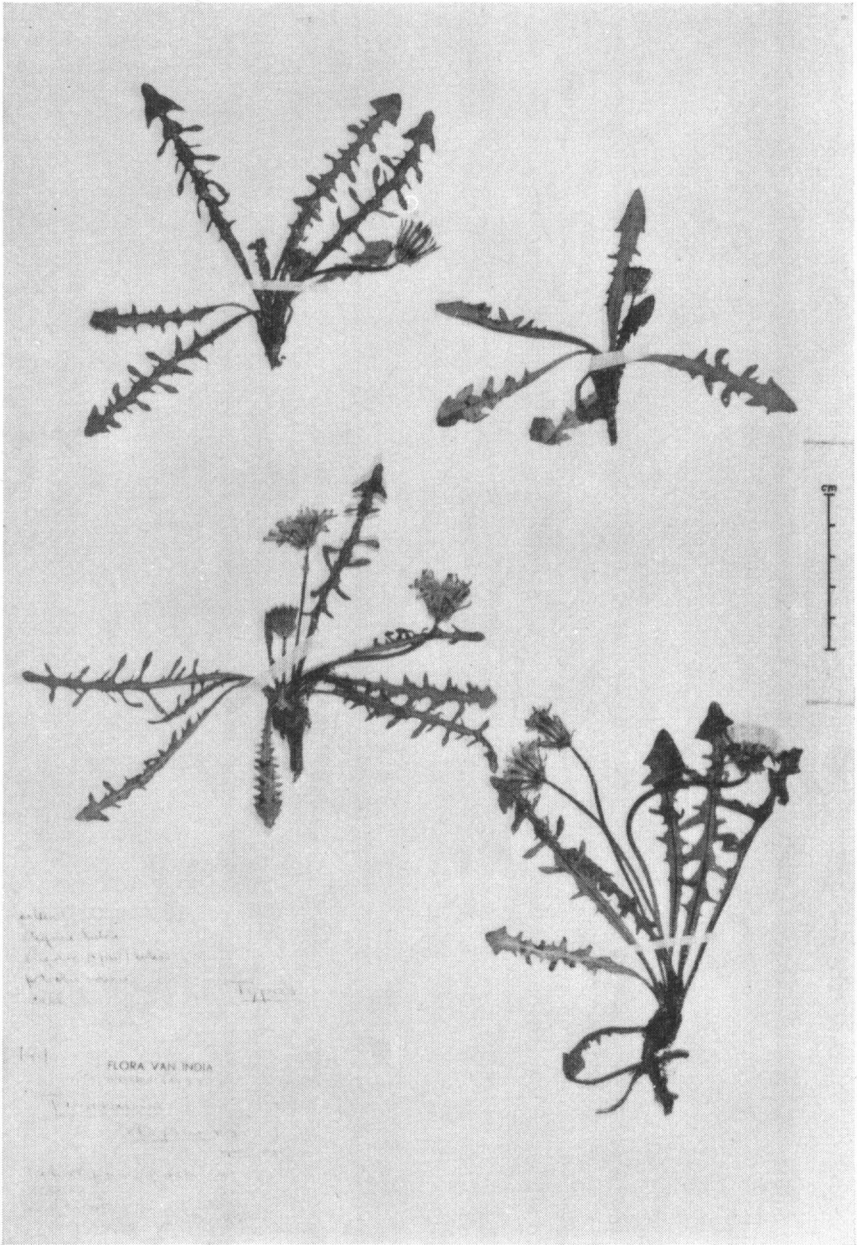


Fig. 18. *T. elegans*

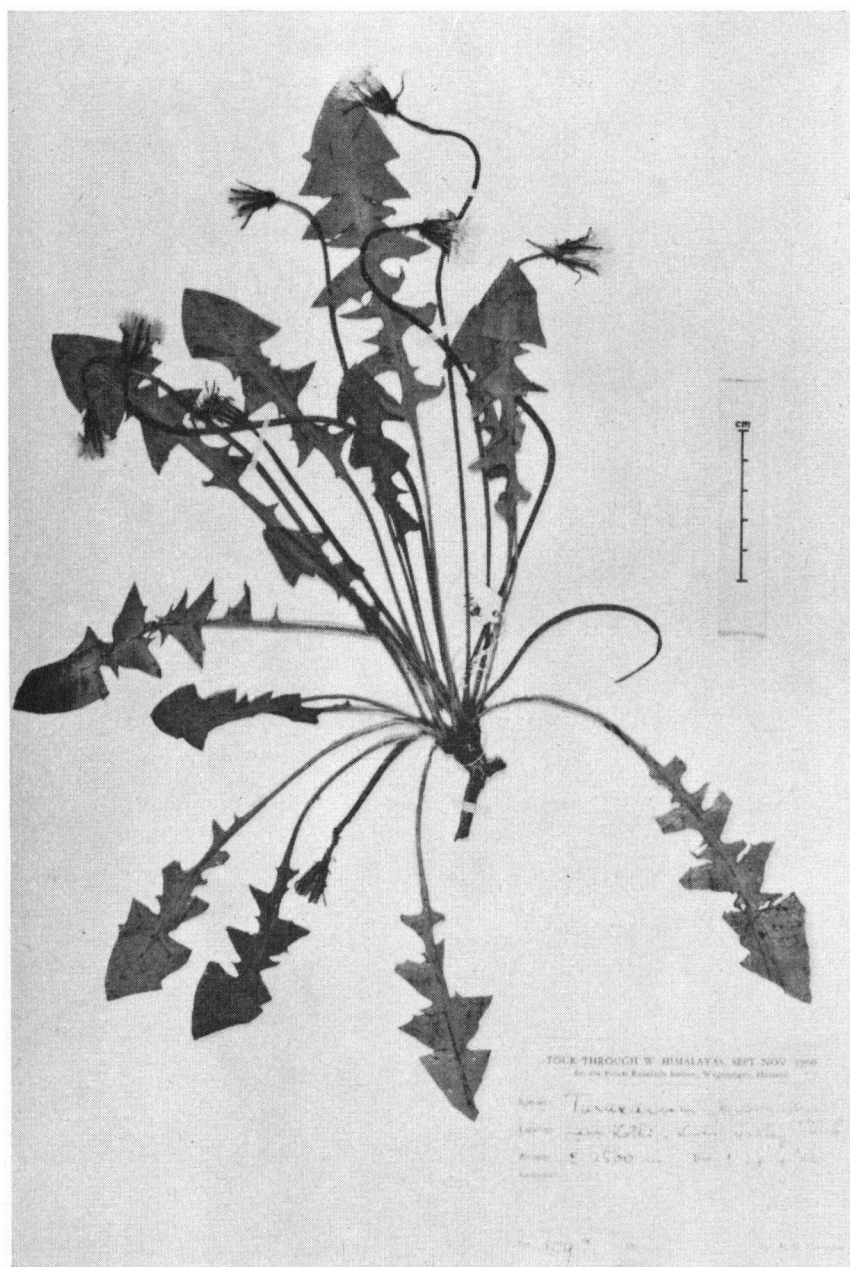


Fig. 19. *T. heybroekii*

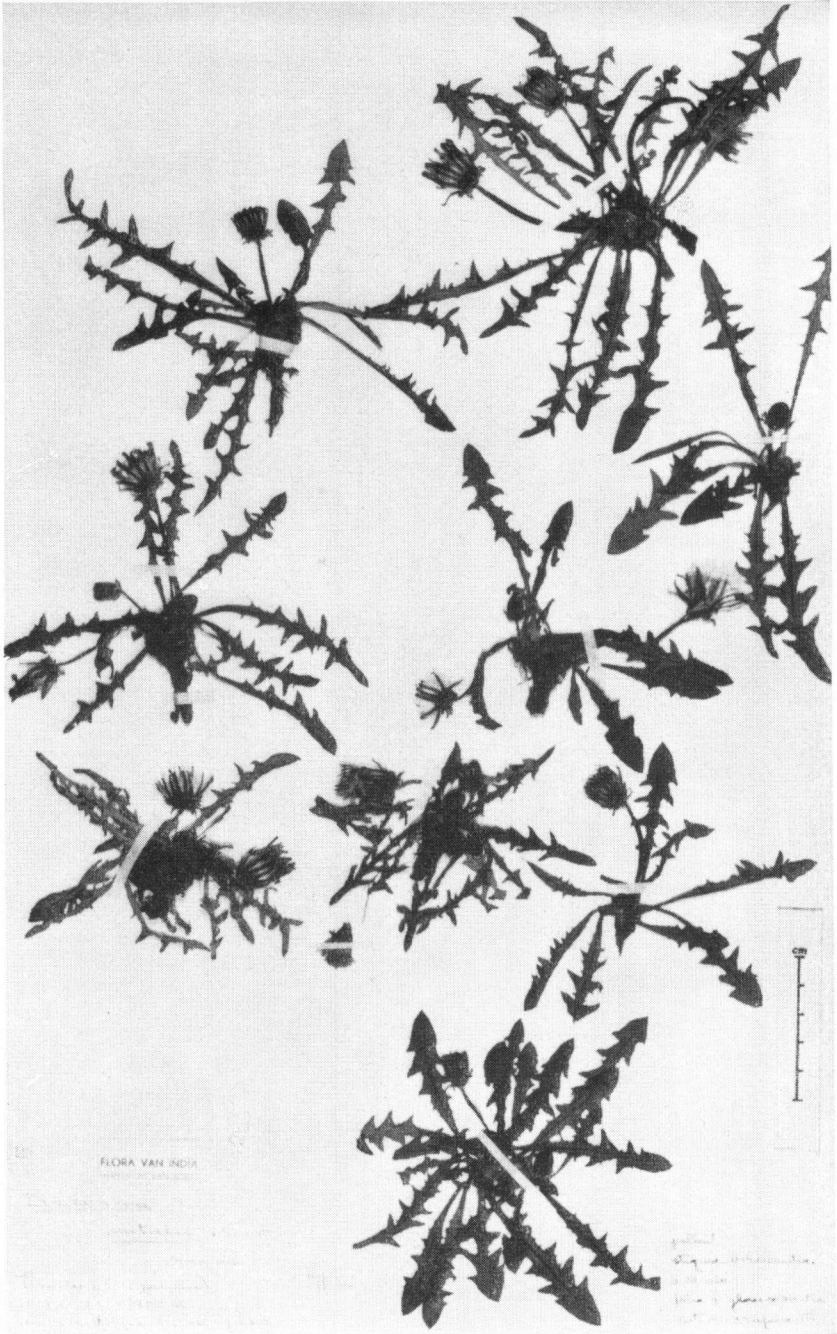


Fig. 20. *T. mitalii*



Fig. 21. *T. nigrum*

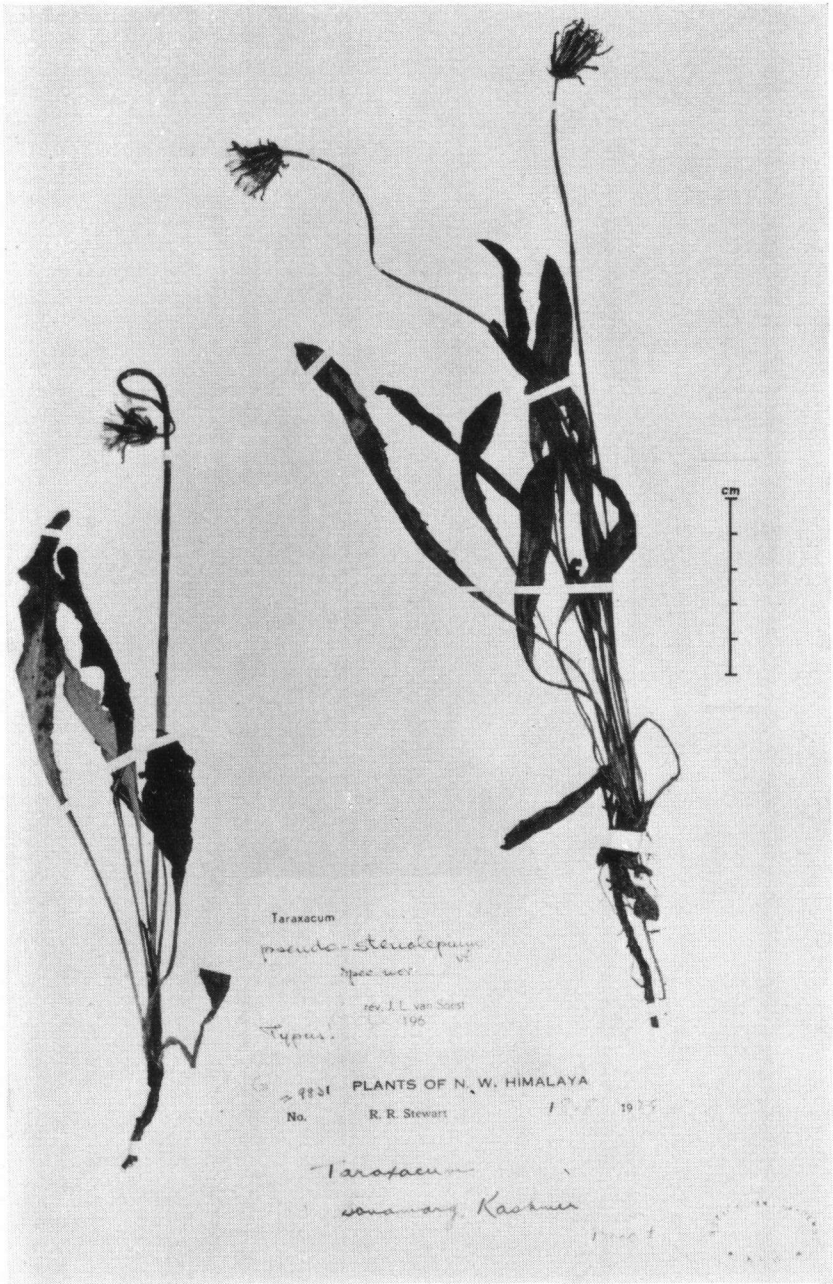


Fig. 22. *T. pseudo-stenolepium*



Fig. 23. *T. stewartii*

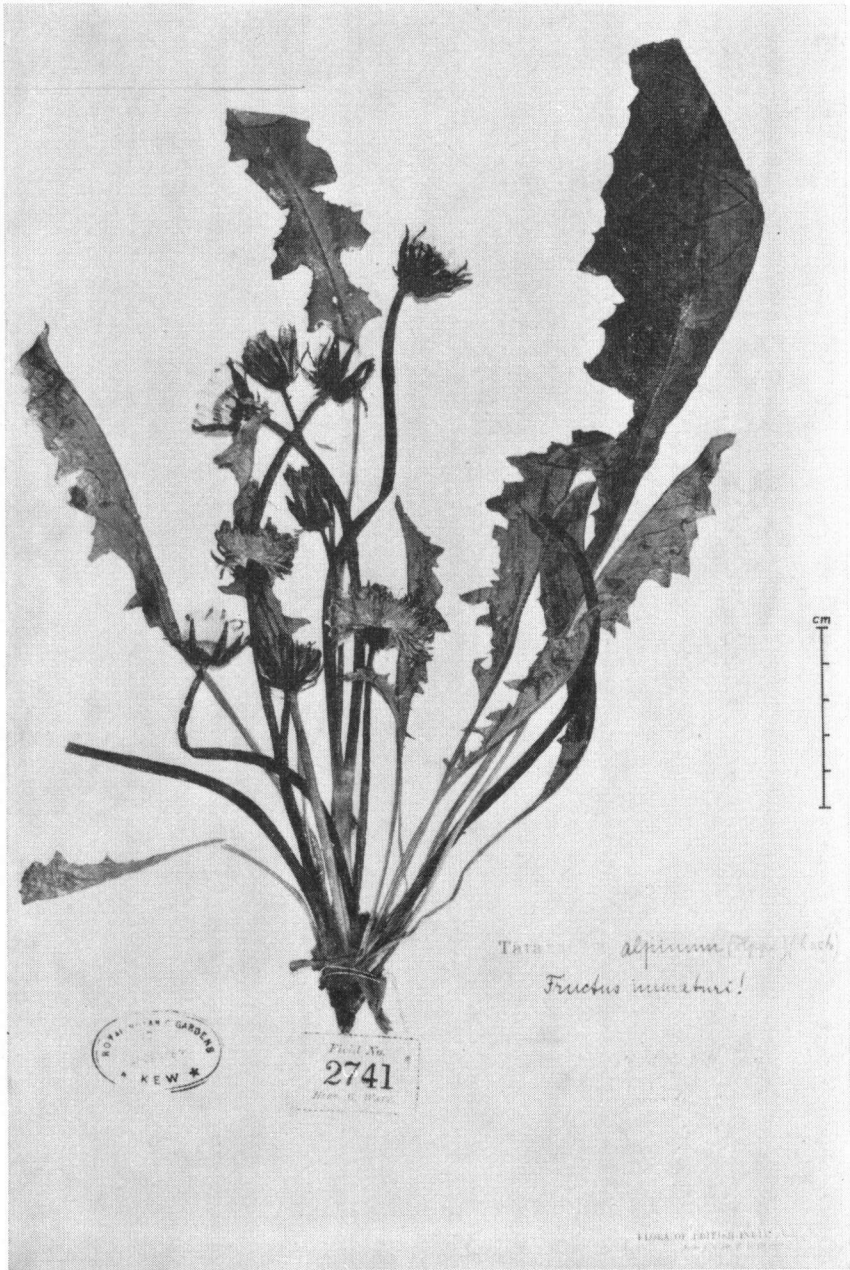


Fig. 24. *T. wattii*

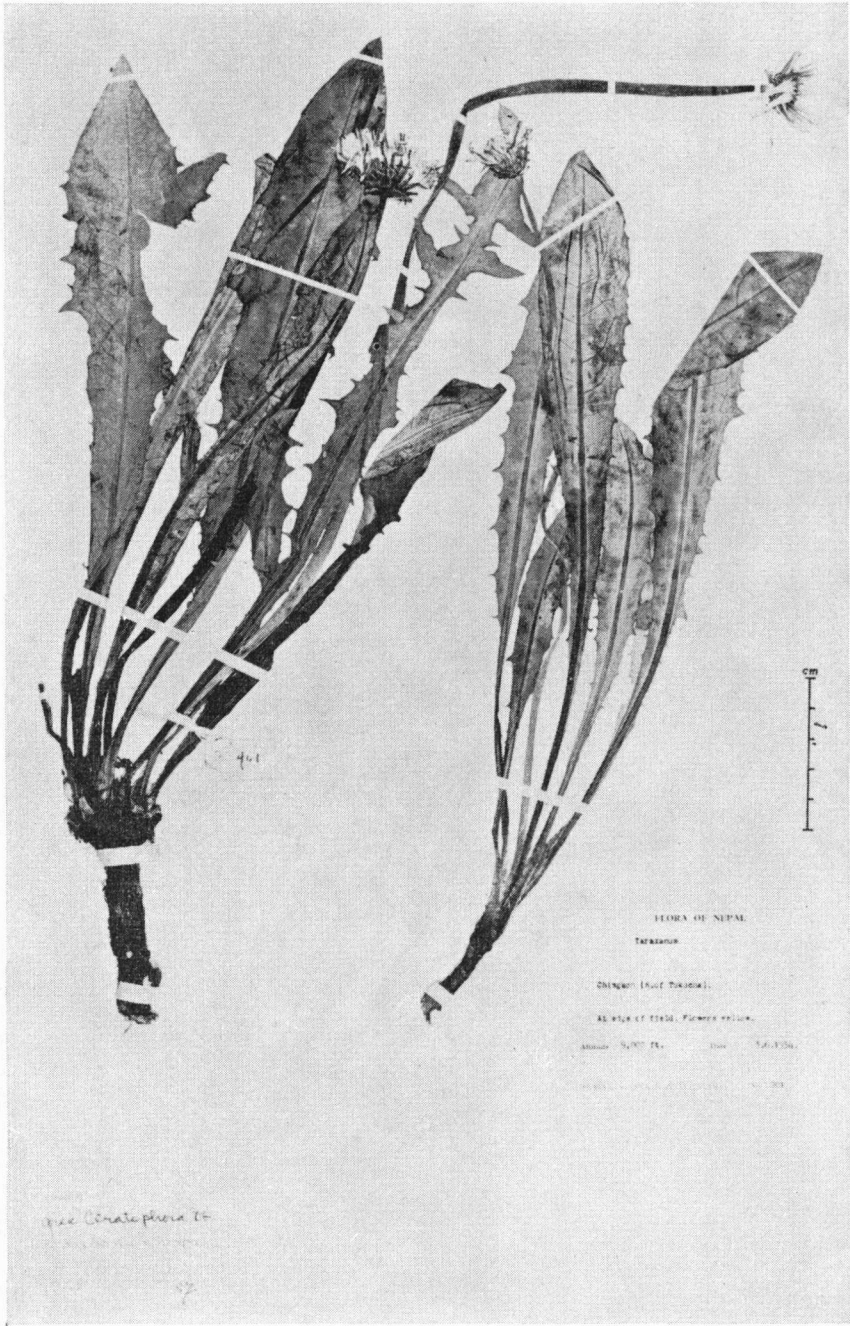


Fig. 25. *T. Staintoni*

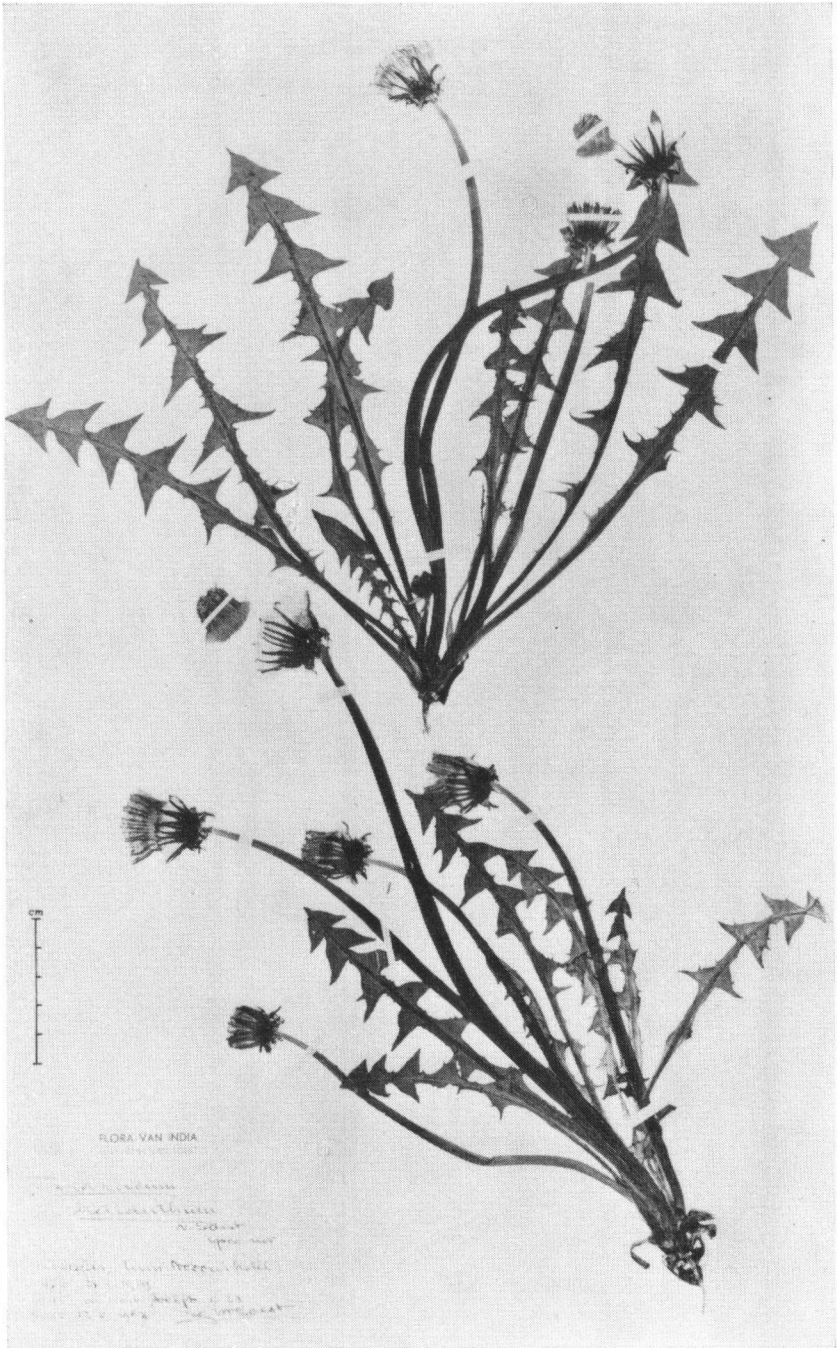


Fig. 26. *T. helianthum*

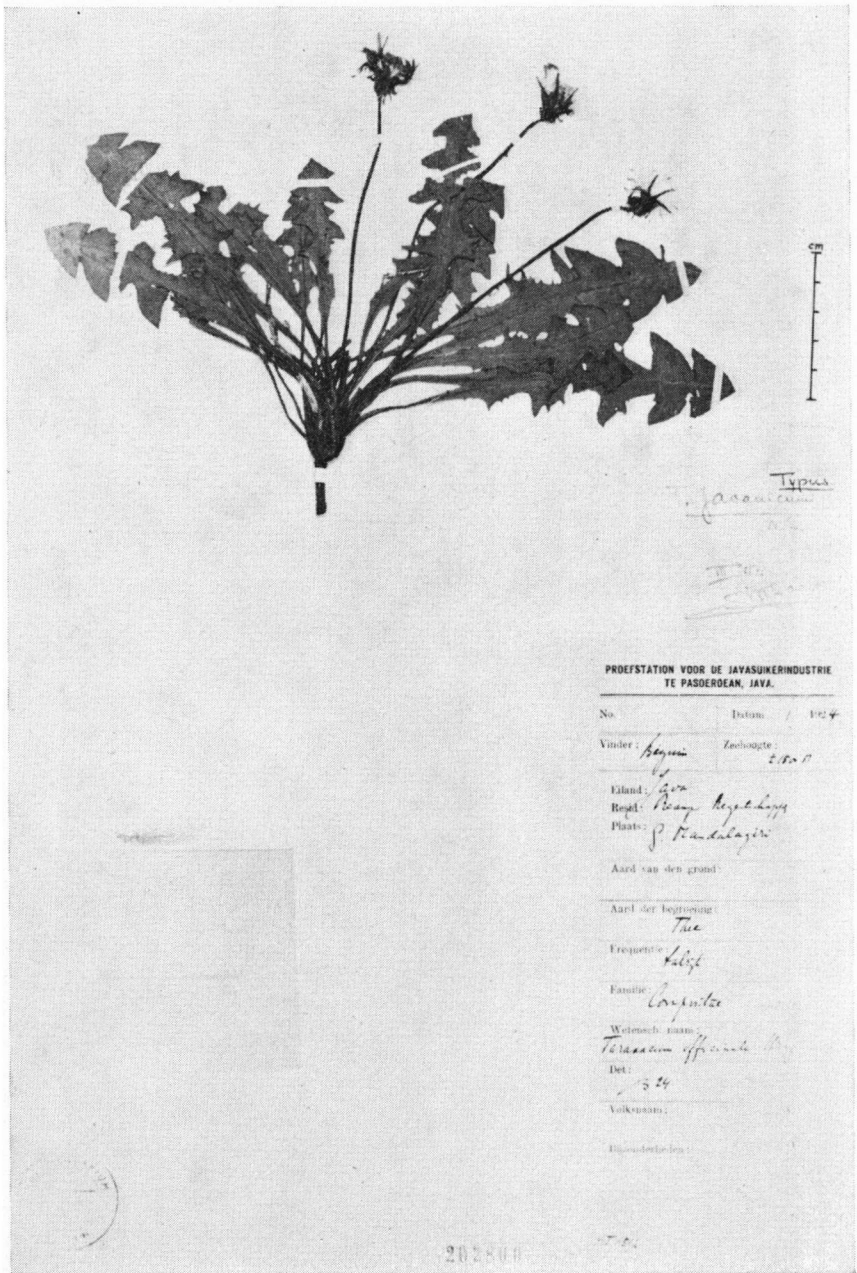


Fig. 27. *T. javanicum*

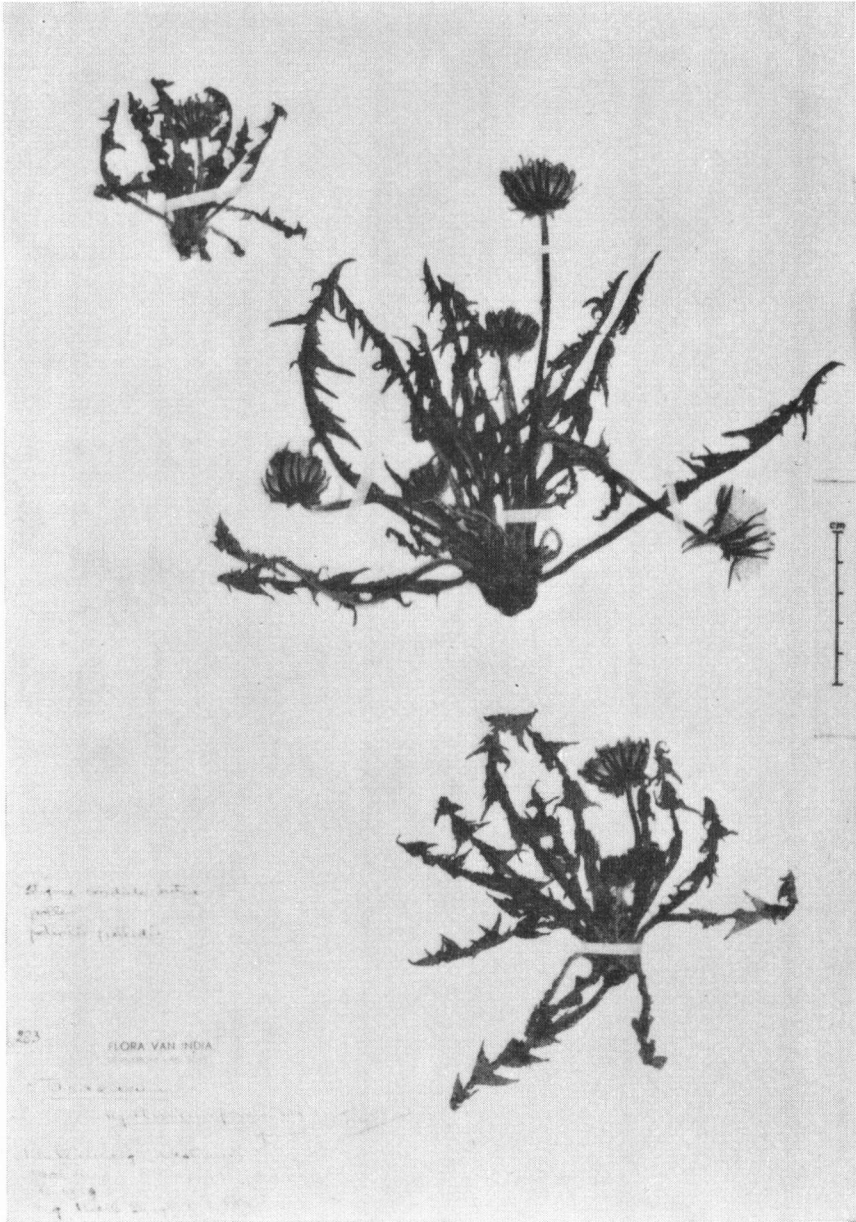


Fig. 28. *T. kjellmaniiforme*

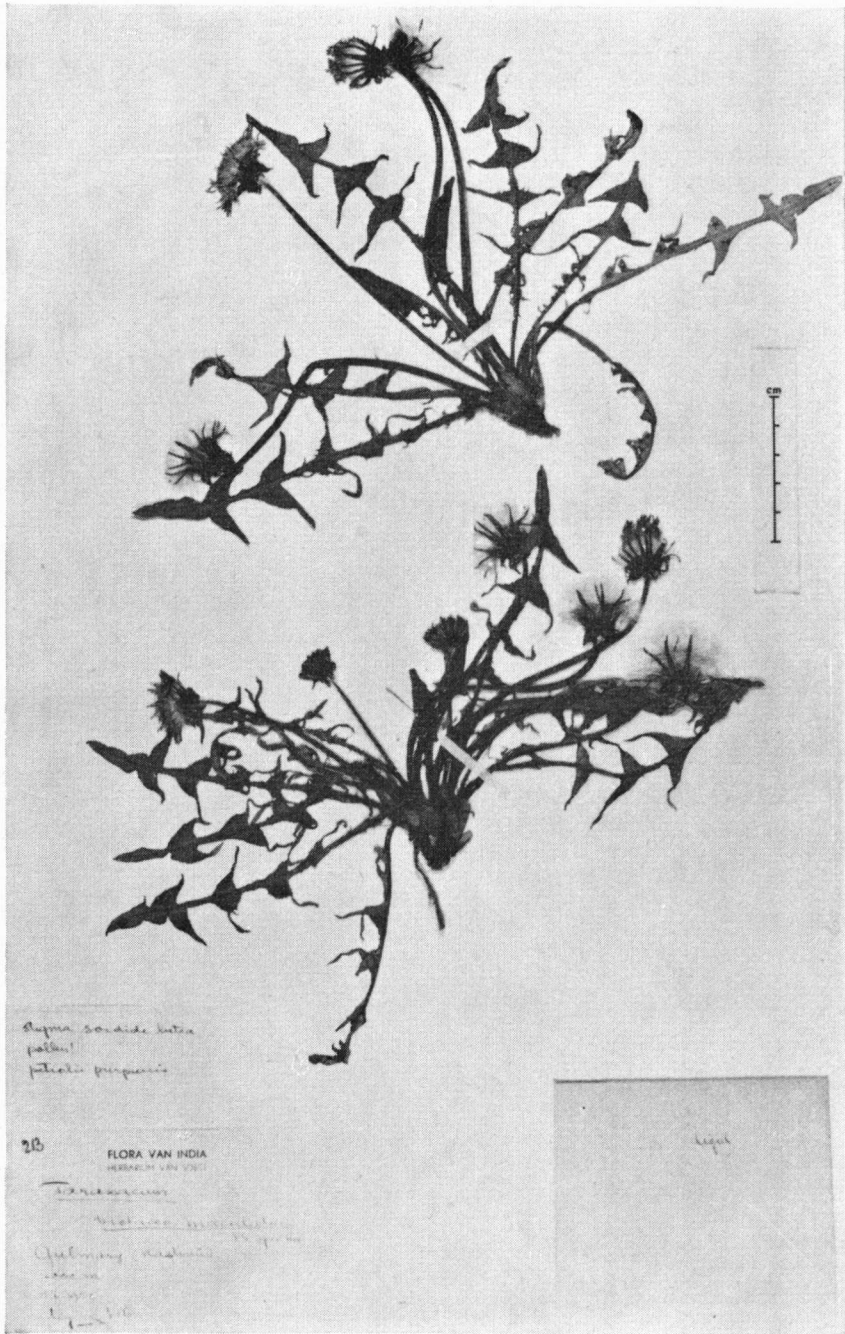


Fig. 29. *T. violaceo-maculatum*

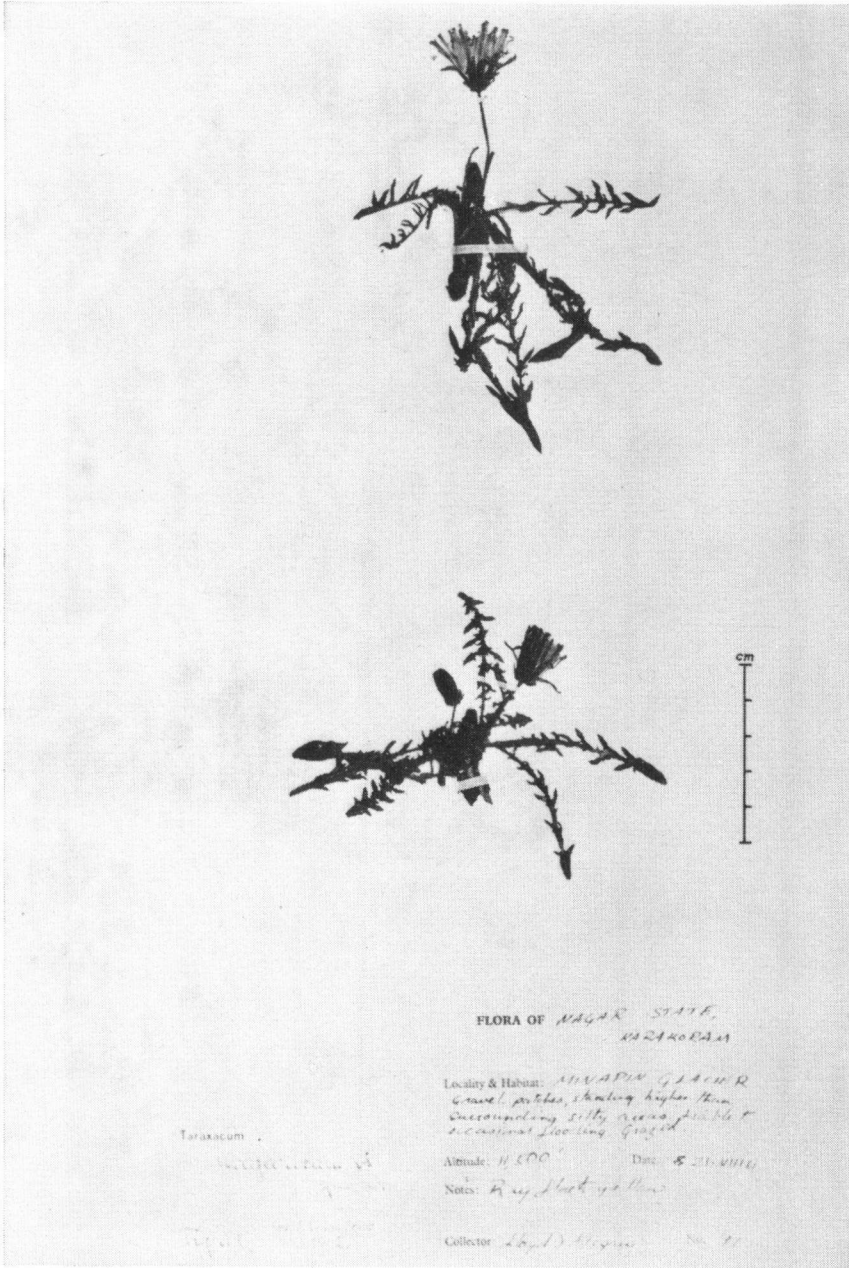


Fig. 30. *T. nagaricum*



Fig. 31. *T. sherriffii*