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TAXONOMIC STUDIES ON THE ASTERACEAE OF DIR KOHISTAN KHYBER PAKHTUNKHWA PAKISTAN

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Abstract:

Taxonomic investigation of the Asteraceae growing throughout the Dir Kohistan was carried out. A total of 45 species under 33 genera of the Asteraceae were collected and identified. Eight 9 genera of the Asteraceae are cultivated in the study area which included 9 species. A brief taxonomic description of each species is given with Vernacular name. About the total number of species Xanthium strumarium, Artemisia scoparia, Silybum marianum, Cichorium intybus, Achillea millefolium, Taraxacum officinale and Senecio chrysanthemoides are much populated the study area.

KEY WORDS:

Taxonomic studies.

INTRODUCTION:

Asteraceae (Compositae) is an advanced and botanically highly specialized family of mainly herbaceous plants. They are widely distributed in the tropics and warm temperate regions of South, South-East and East-Asia, Africa including Madagascar and central South America. The family is represented by about 950 genera and 20000 species all over the world (Sharma, 2004). Some of the genera of this family Aster, Helianthus, Chrysanthemum, Tagetes etc. are ornamentals and most of them have medicinal values. Many species of this family are the sources of medicine. Some are widely cultivated in the field for vegetable and food. The Compositae are the largest family of vascular plants, and the genera are estimated to number about 950 genera and the species probably 20000. They are distributed over most of the earth and in almost all habitats. The greater proportions are herbaceous, although about 2 percent are trees or shrubs (Lawrence, 1973). The order Asterales consists of a single family, the Compositae or sunflower family, the largest of all plant families, including perhaps 20000 species. The Compositae are not only a large family abundant everywhere but, as may be expected, a diverse one. Evolution has produced in many directions and the principal developmental lines are summarized by grouping of related genera into tribes (Benson, 1957, Huq, 1986, Pasha, 1988).

MATERIALS AND METHODS

Taxonomic investigation on the family Asteraceae growing throughout the Dir kohistan was carried out. The study area include eight villages of Dir Kohistan are Sheringal, Patrak, Kalkot, Lamoutai,

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Jandera, Guldai, Kumrat and Shahoor. A total of 45 species under 33 genera of the Asteraceae were collected and identified. All the species were noted and time to time the areas were visited to see when they are in flowering season. For the morphological study, different types of species were examined again and again in order to see if there was any variation or not. They were collected at flowering stages and herbarium specimens were prepared as vouchers. In this practice standard method was followed. To compare their flower shape and colour, photograph were taken. In this regard different types of plant species were collected from different habitats. Herbarium sheets were made from the collected plants, all the collected plant specimens were kept in the laboratory herbarium, Department of Botany, University of Malakand, Chakdara. The collected specimens were identified studying related taxonomic books and booklets from the library of University of Malakand. The major collected materials were identified and described up to species with the help of Stewart checklist and Flora of Pakistan (Cronquist, 1968, Hooker, 1877, Prain, 1903).

RESULTS AND DISCUSSION

From this study 45 species under 33 genera of the Asteraceae were collected and identified. Most of the wild species are grown in all districts of the study area. Some of the species which are sometimes cultivated and sometimes wild are grown in particular area. Most of the species are distributed all over the study area. The genera Key and a check list of collected specimens are placed as follows:

Key to the genera

- 1Achenes in hard prickly, bichambered burs-----Xanthium
- +Achenes not in hard prickly, bichambered burs -----2
- 2Plants shrubs or subshrubs-----3
- +Plants herbs-----6
- 3Florets pale, yellow-----4
- +Florets white, lilac-----5
- 4Capitulum heterogamous, tubular florets unisexual----- Artemisia
- +Capitulum homogamous, tubular florets bisexual ----- Seriphidium
- 5Florets white. Disc florets bisexual, sterile----- Parthenium
- +Florets pink or violet. Disc florets functionally male----- Pluchea
- 6Plants spinescent-----7
- +Plants spineless -----11
- 7Stems with continuously or interrupted spiny wings-----8
- +Stem without spiny wings-----9
- 8Achenes with simple pappus----- Onopordum
- +Achenes with feathered pappus ----- Cirsium
- 9Leaves with milk white veins----- Silybum
- +Leaves otherwise -----10
- 10 Flowers yellow, pappus present, bristles in 1-2 series-----12
- +Flowers yellow, pappus non or scale like----- Carthamus
- 11 Pappus bristles in 2 seriate----- Cnicus
- +Pappus bristles in 1 seriate-----Cousinia
- 12Leaves grass like ----- Tragopogon
- +Leaves otherwise-----13
- 13Flowers blue----- Cichorium
- +Flowers white or yellow-----14
- 14Ray florets white----- 15
- +Ray florets not white-----16
- 15Ray florets usually five-----17
- +Ray florets more than five-----Eclipta
- 16Leaves 2-3 times pinnate into linear segments----- Achillea
- +Leaves simple opposite toothed----- Galinsoga
- 17Foliage all basal, Capitulum scapose----- Taraxacum
- +Not as above -----18
- 18Plants white tomentose, capitula with conspicuously spreading bracts----Leontopodium
- +Plants not white tomentose, capitula without conspicuously spreading bracts -----19
- 19Florets in the capitulum all ligulate-----20

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+Florets in the capitulum tubular or tubular and ligulate-----	21
20Achenes 3-5 ribbed with white simple pappus-----	Sonchus
+Achenes many ribbed with bristled plumose pappus-----	Scorzonera
21Florets tubular.Achenes without pappus-----	Tanacetum
+Florets tubular and ligulate. Achenes with pappus-----	22
22Achenes ribbed -----	23
+Achenes not ribbed-----	Conyza
23Phyllaris 3-5 seriate-----	Solidago
+Phyllaris 5-22 free -----	Senecio

Xanthium strumarium L., Sp. Pl. 2: 987. 1753. (Vernacular Name: Gishkae): Herbs, annual, 20-120 cm. high; Stems nodal spines absent. leaves ovate-deltate, 9-25 cm, papery, densely scabrid on both surfaces, base shallowly cordate to widely cuneate, margin irregularly dentate, often obsolete 3-lobed, apex acute. Capitula monoecious. Male capitula in terminal umbels; phyllaries 1-seriate, oblong-lanceolate, 2.2 mm; outer paleae oblong-lanceolate, inner paleae lanceolate, 2.2 mm; corolla white, tubular, 2.5 mm, 5-dentate. Female capitula axillary; phyllaries 1-seriate, oblong-lanceolate, 3 mm, inner bracts connate with outer paleae. Burs sessile, oblong, ellipsoid, or ovoid, 10-18 × 6-12 mm, densely puberulent, 2-beaked. Fl. Per.: July-September. 100-3000m.

Genus: *Artemisia* L., Sp. Pl. 1845.

Key to the species

1Disc-florets functionally male, with rudimentary ovaries; styles shorter than the corolla-----	Artemisia scoparia
+Disc-florets fertile, with well-developed ovaries, styles as long as or longer than the corolla.-----	2
2Ultimate leaf segments 2 mm or more wide.-----	Artemisia vulgaris
+Ultimate leaf segments less than 1.5 mm wide.-----	3
3Capitula sessile-----	Artemisia biennis
+Capitula shortly peduncled-----	Artemisia santolinifolia

Artemisia scoparia Waldst. & Kit., Pl. Rar. Hung. 1: 66. t. 65. 1802. (Vernacular Name: Jaukay): Biennial or perennial, basally woody herb. Stem branched in upper part, 40-80 (-90) cm tall. Leaves with 1.5 cm long petiole, densely patulous hairy to almost glabrous, subsessile to sessile. Capitula heterogamous, numerous, shortly pedunculate, oblong-globose. Florets 10-12, yellow; marginal florets 5-6, fertile, with 0.7 mm long, tubular, 2-dentate corolla; disc-florets 5-6, functionally staminate, with 1.25 mm long, tubular, 5-toothed, glandular corolla. Cypselas oblong-oval, 0.8 mm long, brown. Fl. Per.: July-November. 700-3500m.

Artemisia vulgaris L., Sp. Pl. 848. 1753. (Vernacular Name: Tarkha): Perennial, shrub: height 50-18 cm tall. Leaves densely whitish, petiolate, lamina widely ovate, 5-12 (-15) x 3-6 (-8) cm, unipinnatisect into elliptic-ovate, pinnatifid primary segments with acute lobes. Capitula heterogamous, numerous, subsessile, oblong, 3-4 x 2 mm, erect, in 10-40 x 5-25 cm, widely pyramidal panicle with 5-20 cm long. Receptacle glabrous, hemispherical. Florets 10-30, yellow with reddish tinge; marginal florets 5-10, female, fertile, with 1.75-2 mm long, bidentate, glandulose corolla tube; disc florets 5-20, bisexual, fertile, with 1.5-2 mm long, narrowly tubular-campanulate 5-toothed glandulose corolla. Cypselas light brown, 1 mm long, finely striate. Fl. Per.: August-November. 1200-3500m.

Artemisia biennis Willd., Phytogr. 11, n. 39. 1794. Annual or biennial glabrous, non-aromatic herb with up to 1.8 (-2.5) m tall, erect, striate, unbranched, pale-green or purple tinged stem. Basal leaves with 3-6 cm long petioles; lamina oblong-ovate to elliptic, subsessile to sessile, Capitula heterogamous, numerous, erect, hemispherical-oblong. Receptacle conical, 1 mm long, glabrous. Florets numerous, all fertile, greenish-yellow. Cypselas oblong-oblongeolate, 0.8 - 1 mm long, finely striate, brown. Fl. Per.: July-September, 1000-3500m.

Artemisia santolinifolia Turcz. ex Krasch., Fl. Zap. Sib. 11: 2791. 1949. Perennial with numerous, occasionally solitary, erect, very straight, branched above, brownish-violet, sparsely pubescent to glabrous, ridged and furrowed stem from much branched, 1 - 1.5 cm thick, woody rootstock. Leaves with up to 2.5 cm long petiole. Capitula shortly peduncled or sessile. Receptacle convex, glabrous. Florets yellow. Cypselas brown, 1 mm long. Fl. Per.: July-September, 1000-3500m.

Seriphidium kurransense (Qazilb.) Y. R. Ling, Bull. Bot. Lab. N.-E. Forest. Inst., Harbin. 11(4): 9.

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1991. (Vern.: Tirkha): A woody shrublet with several, up to 60 (-80) cm tall. Leaves densely whitish tomentose to glabrescent; lower and on sterile shoots petiolate, equal, lamina ovate. Capitula sessile, homogamous, oblong. Receptacle subglobose, glabrous. Florets 4 – 5, bisexual, yellow, with 2 mm long, conico-tubular, glandulose, 5-toothed corolla. Cypselas brown, oblanceolate, 1.25 x 0.75 mm, with lateral corolliform scar. Fl. Per.: November-January.

Parthenium hysterophorus L., Sp. Pl. II. 988. 1753. Annuals, biennials, perennials, subshrubs, or shrubs. Stems erect, usually branched. Leaves usually cauline, sometimes in rosettes, alternate, petiolate or sessile. Capitula usually radiate, sometimes disciform. Ray female florets 5(-8), fertile; corollas ochroleucous, tubes stout, glandular. Disk florets functionally male; corollas ochroleucous, funnelliform, lobes 5. Fl. Per.: July-September.1500-3500m.

Pluchea arguta Boiss., Diagn. Pl. Or. Nov. Ser. 2, 3: 5. 1856. Perennial, shrub, pungent, stem and branches terete, glutinous-pubescent to papillose or almost glabrous. Leaves quite variable, sessile, alternate, oblong-oblanceolate or obovate, acute to subacute. Capitula ovoid or campanulate, 4-12 mm in diameter. Florets pink or violet, marginal florets female, filiform, many; disc florets bisexual. Cypselas small, linear to spindle shaped; pappus. Fl. Per.: July-September.1500-3500m.

Onopordum acanthium L., Sp. Pl. 2: 827. 1753. Herbs, biennial. Stems erect, with spiny wings. Leaves toothed or pinnately lobed, spiny. Capitula single or few. Receptacle naked, alveolate. Stamen filaments papillose; anther with short entire to lacerate basal appendages. Style branches long. Achene obovoid, laterally compressed, with 3-5 ribs ending in inconspicuous apical rim; apical plate flat, disk not protruding. Pappus of 1 or several rows of scabrid or plumose bristles of unequal long. Fl. Per.: July-September.500-3500m.

Cirsium falconeri Miller, Gard. Dict. Abr. ed. 4. vol. 1. 1754. Annuals, biennials, or perennials. Stems erect, branched or simple, narrowly spiny-winged. Leaves basal and cauline; finely bristly-dentate to coarsely dentate Receptacles flat to convex. Florets corollas white to pink, red, yellow or purple. Achenes ovoid, compressed, with apical rims, smooth, not ribbed, glabrous. Fl. Per.: July-September.1400-3500m.

Silybum marianum (L.) Gaertner, Fruct. Sem. Pl. 2: 378. 1791. (Vernacular Name: Wergakae): Annuals or biennials, herb slightly tomentose, spiny. Stems erect, usually simple. Leaves basal and cauline; petiolate margins dentate and often coarsely pinnately lobed, teeth and lobes spine-tipped, glabrous or puberulent. Receptacles flat, covered with whitish bristles. Florets 25–100 corollas pink to purple, tubes slender, distally bent, abruptly expanded into short throats, lobes linear; stamen filaments connate. anther bases sharply short-tailed, anther appendages oblong; style branches: fused portions with slightly swollen subterminal nodes, distally cylindrical, distinct portions minute. Fl. Per.: July-September.700-3500m.

Carthamus oxyacantha L., Sp. Pl. 2: 830. 1753. (Vernacular Name: Kareza): Annual or perennial herbs. Stems branched. Leaves pinnatifid, pinnatisect, or undivided, margin usually spiny. Capitula homogamous, 1 to several at end of stem and branches. Florets bisexual. Stigmatic branches short. Achene ovoid, oblanceolate, or obpyramidal, outer achenes often without pappus; inner achenes usually with a persistent or connate and deciduous pappus. Pappus elements in many rows or absent. Fl. Per.: July-September, 800-3500m.

Cnicus benedictus L., Sp. Pl. 2: 826. 1753. Annual growing up to 60 cm tall, with leathery, hairy leaves up to 30 cm long and 8 cm wide, with small spines on the margins. Flowers yellow, produced in a dense capitulum 3-4 cm diameter; surrounded by numerous spiny basal bracts. Fl. Per.: July-September.1200-3500m.

Cousinia minuta. Cuvier, Dict. Sci. Nat. 47: 503. 1827. Herbs, biennial or perennial. Leaves divided or undivided, margin spiny or spinulose. Capitula 1 to many, forming a racemose, paniculate, or corymbose synflorescence, or solitary, glabrous to cobwebby. Involucre spherical to cylindrical. Phyllaries 3-5 seriate, imbricate, leathery, ending in a spine. Stamen filaments glabrous; Achene obovoid to obconic, laterally compressed, with (2-)4 or 5 raised ribs, rugose, apex rimmed; rim sometimes denticulate. Pappus rarely absent, when present bristles in 3 rows, outer ones much shorter than inner. Fl. Per.: July-September.1500-3500m.

Tragopogon gracilis D. Don, Mem. Wern. Nat. Hist. Soc. 3: 414. 1821. Perennial herbs to 20 -30 cm tall. Stems few, simple, slender, erect, glabrous. Basal and lower cauline leaves lanceolate-subulate, Capitulum solitary; peduncle not inflated. Ligules bicolored, abaxially with pink or mauve spot, adaxially yellow. Outer achenes 1.3-1.8 cm; body pale brown, slightly curviform, 1.3-1.6 mm in diam., slightly tuberculate, with small (40-50 µm in diam.) hollows in pericarp; beak slender, 5-7 mm. Pappus dirty white, 1.5-2 cm. Fl. Per.: July-September.1500-2500m.

Cichorium intybus L., Sp. Pl. 2: 813. 1753. (Vernacular Name: Hans Shamakae): Perennials herbs. Leaves: blades basal cauline, smaller, narrower, distal mostly linear. Achenes 2–3 mm; pappi 0.01–0.2 mm. Fl. Per.: July-September.1500-3500m.

Eclipta prostrata(L.) L.Mant.2:286.1771. Annual or perennial, herbs, erect, branched. Leaves

opposite, toothed. Capitula terminal on stems and branches or axillary, pedunculate, heterogamous. Ray florets bisexual, mostly fertile, lamina minutely 2-lobed, white to yellowish. Disk florets bisexual, corolla tubular, greenish white to yellowish, 4- or rarely 5-lobed; anthers entire or very shortly bifid at base; style branches obtuse, mammillate at apex. Achenes thick, maturing and falling rapidly, those of ray florets 3-angled, those of disk florets compressed, 4-angled, coarsely hairy, tuberculate, margin with 1-3 minute teeth, apex truncate and depressed; pappus absent, coroniform, or of 2 or 3 awns. Fl. Per.: July-September, 1500-2500m.

Achillea millefolium L., Sp. Pl. 899. 1753. (Vernacular Name: Jasifa, Jarai): Annual shrublet erect, up to 1 m tall, Leaves long-petiolate, green, homomorphic, cauline. Capitula 5-6 mm across. Paleae whitish membranous, with green midrib, lanceolate, obtuse and fimbriate, upwards pilose. Ray-florets 4-6, with whitish or pale-white, Disc-florets 10-20, with 2-3 mm long, 5-toothed corolla tube. Cypselas oblong, flattened, 2.5 mm long, glaucous-glabrous. Fl. Per.: July-September. 1200-3500m.

Galinsoga parviflora Cavanilles, Icon. 3: 41. 1795. Annual herbs 4-60 cm tall. Leaf blade 7-110 mm. Peduncles 1-40 mm; involucre campanulate, 2.5-5 mm in diam.; phyllaries persistent; outer paleae persistent with distal inner phyllaries or deciduous, elliptic to obovate, inner usually persistent. Ray florets corollas usually dull white or pink. Disk florets 15-50. Ray achenes 1.5-2.5 mm; pappus absent or of 5-10 lacinate scales 0.5-1 mm; disk achenes 1.3-2.5 mm, glabrous or strigose; pappus absent or of 15-20 gray, sometimes white, linear, fimbriate, obtuse or acute scales 0.5-2 mm. Fl. Per.: July-October. 1500-2000m.

Taraxacum officinale Weber in Wigg., Fl. Holsat. 56.1780. (Vernacular Name: Zergulae): Annual herbs. Leaves commonly sparsely hairy on midrib on lower surface, leaves varying to deeply cleft and with a small terminal segment; scapes 5-50 cm tall, glabrous or somewhat villous, especially upward. Involucre mostly 1.5-2.5 cm long; inner bracts mostly 13-20, usually not or scarcely corniculate, at first erect, finally reflexed, mature achenes and pappus then forming a conspicuous ball; outer bracts reflexed, slightly shorter and scarcely wider than inner; achenes 3-4 mm long, pale-brown or stramineous, muricate apically or sometimes to near base, beak 2.5-4 times as long as body. Fl. Per.: July-September, 500-3500m.

Leontopodium leontopodium (DC.) Hand.-Mazz. in Beih Bot. Centralbl. 44: 118. 1928. Perennial, herbs, 8-25 cm high, white tomentose, densely covered by old leaf bases below. Basal leaves clustered, oblong spatulate, sometimes brown apiculate, cauline leaves 1.8-6 cm long, oblong lanceolate to spatulate, very obtuse to subacute. Capitula 5-7 (-10), clustered or in terminal corymbs, 5-8 mm in diameter. Inflorescence bracts 13-35 mm long, ovate to linear-lanceolate upper face more densely white or yellowish grey tomentose than the cauline leaves; phyllaries oblong 3-6 x 1-2 (-2.5) mm with broad brown scarious margin. Corollas 3-4 mm long. Cypselas 1.5-2 mm, glabrous or sparsely pubescent, rudimentary ovaries in male florets always glabrous. Fl. Per.: July-September. 1600-3000m.

Genus: *Sonchus* L., Sp. Pl. 2: 793. 1753.

Key to the species

1 Achene strongly compressed, wrinkled ----- *S. asper*
 + Achene distinctly compressed, not wrinkled ----- *S. oleraceus*

Sonchus asper (L) Hill, Herb. Brit. 1: 47. 1769. (Vernacular Name: Shudapai): Annual herbs 20-50 cm tall. Stem usually unbranched and glabrous. Basal and lower stem leaves extremely variable. Capitula with many florets; peduncle 0.5-5 cm, slender, glabrous or densely glandular hairy. Involucre campanulate, 1.2 cm. Phyllaries abaxially glabrous or more rarely glandular hairy, apex acute; outer phyllaries narrowly lanceolate, 1-2 mm wide. Corolla 1 cm. Achene widely obcolumnar, 2-3 mm, strongly compressed, winged, between lateral ribs usually with 3 slender ribs on either side, space between slender ribs much wider than ribs, smooth with only lateral ribs usually antrorsely finely spinulose. Fl. Per.: July-September. 100-3500m.

Sonchus oleraceus L., Sp. Pl. 2: 794. 1753. Annual or biennial herbs 40-150 cm tall. Stem below simple or branched, glabrous. Basal and lower stem leaves with basal portion petiole mostly smaller than middle stem leaves. Capitula with many florets; peduncle 0.5-3(-5) cm, slender, glabrous, glandular hairy, or apically white tomentose. Involucre campanulate, 1-1.2 cm. Phyllaries glabrous or with few glandular hairs, apex obtuse; outer phyllaries triangular to narrowly lanceolate, 1-3 mm wide. Corolla 1-2 cm. Achene obcolumnar, 2.5-4 mm, distinctly compressed, between lateral ribs with 3(-5) slender ribs on either side, space between slender ribs much wider than ribs, distinctly rugose when fully mature. Fl. Per.: July-September. 100-3500m.

Scorzonera virgata L., Sp. Pl. 2: 790. 1753. Perennial or annual herbs, rarely subshrubs, often with woody caudex and rosulate. Leaves usually linear to linear-elliptic or lanceolate, more rarely also ovate.

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Receptacle naked. Florets yellow (and often pinkish on drying) or rarely orange or pale purple, 1.1-2 × as long as involucre. Achene cylindrical to columnar, with numerous smooth or tuberculate longitudinal ribs, glabrous, puberulent, or villous along entire long or apically only, apex truncate or more rarely attenuate. Pappus of strong bristles, persistent or caducous. Fl. Per.: November-January, 1000-3500m.

Genus: *Tanacetum* L., Sp. Pl. 2: 843. 1753.

1 Inflorescence with 10-70 capitula; stem leaves elliptic-ovate-----*T. emodi*
+ Inflorescence with 3-10 capitula; stem leaves linear-oblong -----*T. artemisioides*

Tanacetum emodi R. Khan, Edinb. J. Bot. 48 (1): 45. 1991. Suffruticose, 19 – 28 (-40) cm tall herb with woody, often glabrous, basally leaf-scar bearing stem. Leaves alternate, 1 – 1.5 cm long including petioles, divided less than halfway to midrib, the uppermost leaves sometimes linear and entire. Capitula solitary, 0.5 – 1.7 cm in diameter, wider than long, on very short peduncles. Phyllaries 4 – 5 mm long, often with sessile glands and dark brown scarious margins. Receptacle convex, Ray-florets 0.8 – 1.3 (-1.5) mm long. Disc-florets 2.5 – 3 (-3.5) mm long. Cypselas 0.75 – 1.5 (-2) mm. Pappus of deltate rigid teeth, less than 0.5 mm long. Fl. Per.: July-August, 1600-3000m.

Tanacetum artemisioides Schultz-Bip. ex Hook. f., Fl. Brit. India. 3: 318. 1881. (Vernacular Name: Zear gulae): Erect, up to 60 cm tall, pale green shrublet with several branches from the woody rootstock. Leaves oblong, more or less palmately 1-2-pinnatisect into 2 – 3 mm long, basal and lower leaves petiolate, cauline subsessile to sessile. Capitula discoid, shortly to moderately pedunculate, Receptacle convex, naked. Ray-florets absent. Disc-florets yellow, with 3 – 4 mm long, 5-toothed corolla. Cypselas light brown. Fl. Per.: August-September, 1500-3000m.

Conyza canadensis (L.) Cronquist, Bull. Torrey Bot. Club. 70: 632. 1943. (Vernacular Name: Maloch): Plants erect, branched mostly distally. Leaves: faces usually glabrate, entire; distal similar, smaller, entire. Heads usually in paniculiform, sometimes corymbiform arrays. Receptacles in fruit. Pistillate florets corollas equaling or surpassing styles, laminae 0.3–1 mm. Disc florets 8–30+. Cypselae uniformly pale tan to light gray-brown, 1–1.5 mm, faces sparsely strigillose; pappi of 15–25, white bristles 2–3 mm. Fl. Per.: July-September. 500-2000m.

Solidago virgaurea L., Sp. Pl. 2: 878. 1753. Herbs, perennial, rarely subshrubs; rhizome short to long or woody caudex. Stems decumbent to ascending or erect. Leaves basal and cauline, alternate, sessile or petiolate, blade ovate to widely to narrowly lanceolate. Capitula usually small, Receptacles slightly convex, alveolate, naked. Florets fertile; ray florets female, 1-seriate, usually yellow, usually glabrous, apex inconspicuously 2- or 3-denticulate; disk florets bisexual, yellow turning brown with age, tubular, limb expanded or narrow, apex 5-denticulate; anther base obtuse; style branches flattened, appendage lanceolate. Achenes cylindrical. Fl. Per.: July-September, 1500-3500m.

Genus: *Senecio* L. 2, 6: 54. 1883.

Key to the species

1 Plants annual-----*Senecio desfontainei*
+ Plants perennial-----*Senecio chrysanthemoides*

Senecio desfontainei Druce, List Brit. Pl. 2: 61. 1928. Herbs, annual. Stems erect or subdecumbent, 10-25 cm tall, usually branched from base or middle; branches erect. Capitula radiate, few to rarely many, terminal, laxly corymbose; peduncles 1-3 cm, sparsely pubescent or glabrous, with a few linear-subulate bracteoles. Ray florets corolla tube 3 mm; lamina yellow, elliptic-oblong, ca. 6 × 2.5-3 mm, 4-veined, apically obtuse, 3-denticulate, becoming revolute. Disk florets many; corolla yellow, 2-2.5 mm tube and funnelform limb; lobes ovate-triangular, 0.7 mm, apically acute. Anthers 1.8 mm, basally distinctly obtuse-auriculate, appendages ovate; antheropodia distinctly dilated at base. Style branches 0.5 mm. Achenes cylindrical, 3 mm, Pappus white. Fl. Per.: July-August, 1500-3000m.

Senecio chrysanthemoides DC., Prodr. 6: 365 (1838). Perennial herbs erect, Stems usually leafy, rarely subscapiform. Leaves simple; radical leaves usually petiolate, not auriculate, deltoid, lyrate or pinnately divided. Capitula rarely solitary, axillary, usually few to numerous, arranged in terminal simple or compound corymbs or thyrses, heterogamous and radiate or homogamous and discoid, erect or nodding, usually pedunculate. Ray florets absent. Fl. Per.: July-August, 1400-2500m.

Note: The Species of the following genera of Asteraceae are in cultivation for ornamental purpose through out in the study areas. These are *Cosmos*, *Helianthus*, *Coreopsis*, *Zinnia*, *Tagetes*, *Erigeron*,

Gaillardia, Calendula and Chrysanthemum.

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