

Biosystematic Studies on the Genus *Ixeris* and its Allied Genera (Compositae-Lactuceae)

IV. Taxonomic Treatments and Nomenclature

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Abstract A taxonomic revision was carried out based on the new data obtained in a series of the present studies concerning chromosome morphology, fruit wall anatomy, and external morphology. Synonyms of all the taxa, keys to the sections and species of *Ixeris*, *Ixeridium*, and *Crepidiastrum* are provided. The present new taxonomic treatments include 25 new combinations.

Ixeris was divided into 5 sections: sect. *Ixeris* (monotypic with only *I. polycephala*), sect. *Chinenses* (including *I. chinensis*, *I. graminifolia*, *I. riparia*, *I. strigosa*, and *I. tamagawaensis*), sect. *Chorisis* (monotypic with only *I. repens*), sect. *Pseudo-chorisis* (incl. *I. debilis* and *I. stolonifera*), and sect. *Sobolixeris* (monotypic with only *I. longirostrata*). *Ixeridium* comprises 12 species (*I. alpicola*, *I. dentatum*, *I. gracile*, *I. laevigatum*, *I. makinoanum*, *I. parvum*, *I. pusillum*, *I. pygmaeum*, *I. siamense*, *I. sagittarioides*, *I. subacaule*, *I. transnokoense*, and *I. yakuinsulare*). *Crepidiastrum* was also divided into 3 sections: sect. *Crepidiastrum* (including *C. keiskeanum*, *C. lanceolatum*, and *C. taiwanianum*), sect. *Monostemma* (incl. *C. ameristophyllum*, *C. grandicollum*, *C. linguaeifolium*, and *C. platyphyllum*), and sect. *Paraixeris* (incl. *C. chelidoniifolium*, *C. denticulatum*, *C. koidzumianum*, *C. saxatilis*, *C. sonchifolium*, and *C. yoshinoi*).

INTRODUCTION

In connection with new evidence from critical studies on the fruit wall anatomy, external morphology and karyology (basic chromosome numbers, chromosome size, types of resting nuclei and karyotypes) of *Ixeris* (*sensu* Stebbins, 1937; Kitamura, 1956), *Crepidiastrum* and *Paraixeris* (Pak and Kawano, 1990a, 1990b, 1990c), it has become necessary to redefine the limits of the above genera referred to Compositae-Lactuceae. This paper proposes new taxonomic accounts and nomenclatural transfers.

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Taxonomic Treatments

Key to the genera

- 1a. Pappus persistent; achenes long-beaked.
 - 2a. Pappus color snow-white as a whole; number of ligules per head 15-41; achenes winged with 10 costae possessing libriform fiber and sclereid-fiber cells; basic chromosome number $x=8$ *Ixeris*
 - 2b. Pappus color yellow or dirty-white; number of ligules per head 5-12; achenes ribbed, with costae possessing only libriform fiber cells; basic chromosome number $x=7$ *Ixeridium*
- 1b. Pappus deciduous; achenes short- or non-beaked; basic chromosome number $x=5$ *Crepidiastrum*

Ixeris Cass., Dict. Sci. Nat. 24:49 (1822); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 23: 105 (1956), p.p.

Syn. *Chorisis* DC., Prodr. 7: 177 (1838); Tzvel., Fl. URSS 29: 393 (1964).

Lactuca sect. *Chorisma* Benth. in Benth. et Hook., Gen. Pl. 2: 526 (1873).

Ixeridium sect. *Chinensia* Tzvel., Fl. URSS 29: 389 (1964).

Lactuca sect. *Ixeris* Benth., in Benth. et Hook., Gen. Pl. 2: 526 (1873) p.p.

Type: *Ixeris polycephala* Cass.

Annual or rarely biennial, and perennial herbs; roots stoloniferous or tap-rooted; leaves mainly radical, but with a few cauline leaves. Inflorescence terminal, corymbose; heads few to many with relatively many florets (15-41). Involucre cylindrical, narrow; bracts 2-seriate, glabrous, herbaceous with scarious margins; inner bracts ovate or linear, equal, 8-10 in number, much larger and longer than the outer bracts; outer bracts short, imbricate; receptacles flat, naked; flowers bisexual, ligulate, 5-toothed, yellow, white or white-purplish. Achenes fusiform, somewhat flattened, equally acute, 10-winged; costae composed of libriform fiber cells and sclereid-fiber cells; pappus bristles many, slender, scaberrulous, persistent, white. Basic chromosome number: $x=8$ (see Pak and Kawano, 1990b).

Key to the sections

- 1a. Stolons elongate; outer involucre bracts prominent, ovate.
- 2a. Stems leafy; heads many. sect. *Sobolixeris*
- 2b. Stems scapose; heads few.
- 3a. Leaves palmately 3- to 5-cleft; intercostae of achenes 5-7 cell layers. sect. *Chorisis*
- 3a. Leaves spatulate, entire or shallowly toothed; intercostae of achenes 1-3 cell layers. sect. *Pseudo-chorisis*
- 1b. Stolons absent; outer involucre bracts short, lanceolate.
- 4a. Annual, heads nodding at maturity, in false umbels; cauline leaves sagittate; achenes deeply sulcate. sect. *Ixeris*
- 4b. Perennial, heads erect at maturity, in loose corymbose; cauline leaves auriculate; achenes shallowly grooved, obtusely winged. sect. *Chinenses*

Sect. *Ixeris*.

Syn. *Ixeris* sect. *Indo-ixeris* Kitam., Bot. Mag. (Tokyo) 49: 289 (1935).

Type: *Ixeris polycephala* Cass.

Annual; plants glaucous; cauline leaves few, sessile, sagittate; inflorescences umbelliform; heads nodding at maturity; achenes deeply sulcate.

1. *Ixeris polycephala* Cass., Dict. Sci. Nat. 24: 50 (1822).

Syn. *Lactuca polycephala* (Cass.) Benth., in Benth. et Hook., Gen. Pl. 2: 526 (1873).

Lactuca matsumurae Makino, Bot. Mag. (Tokyo) 6: 56 (1892), nom. nud.; Bot. Mag. (Tokyo) 12: 45 (1898).

Lactuca bauriculata Vaniot et H. Lév., Bull. Acad. Géogr. Bot. 20: 143 (1909).

Lactuca matsumurae var. *dissecta* Makino, Bot. Mag. (Tokyo) 24: 252 (1910).

Ixeris matsumurae (Makino) Nakai, Bot. Mag. (Tokyo) 34: 153 (1920).

Ixeris polycephala var. *dissecta* (Makino) Nakai, Bot. Mag. (Tokyo) 34: 265 (1920).

Crepis bonii Gagnep., Bull. Soc. Bot. France 68: 47 (1921).

Ixeris polycephala f. *dissecta* (Makino) Ohwi, Fl. Jap. 1246 (1953); Bull. Nat. Sci. Mus. 33:90 (1953).

Distribution: Afghanistan, Assam, Bengal, Sikkim, Nepal, Burma, Cambosia, Laos, Thailand, Vietnam, China, Japan, Korea, Nepal, Caucasia (Kitamura, 1956).

Chromosome number: $2n=16$ (Ishikawa, 1921; Babcock et al., 1937; Pak and Kawano, 1990).

Selected specimens examined. NEPAL. Kathumandu, (Hotel Royal), 12 Apr. 1963, *M. Numata 1* (KYO); Central Nepal: Kapure, 18 Jun. 1963, *M. Numata 1648* (KYO); Sindu Palchok Dist., Lamusangu, 840 m in alt., 25 May 1978, *H. Tabata et al. 9892-B* (KYO). CHINA. Guangdong, Guangzhou, 6 Apr. 1981, *H. G. Yip 155* (KYO). Hupeh: Wuhan City, Wuchang, 40 m in alt., 7 Apr. 1980, *Y. Z. Long 26* (KYO); Wuhan City, 400 m in alt., 9 May 1980, *Y. Z. Long 69* (KYO); Sha Tau Kok, N. T., 25 Apr. 1970, *Y. H. Shin 10008* (KYO). JAPAN. Yamagata: Nishiokitama-gun, Oguni-machi, near Bentoza-wa-tunnel, 300 m in alt., 3 Jun. 1986, *S. Tsugaru & T. Takahashi 6547* (KYO). Kanagawa: Kawasaki City, Noborito, 6 May 1961, *M. Mizushima, 16417* (KYO). Osaka: south of Sakai, Takaishi, Tonogi, 20 May 1953, *K. Seto 3735* (KYO); Hirakata City, Kuzuha, 5 m in alt., 1 May 1981, *K. Tsuchiya 1505* (KYO). Okayama: Akaiwa-gun, Seto-cho, Shiono, 17 Apr. 1983, *I. Okubo s.n.* (KYO). Ehime: Matsuyama City, 10 Apr. 1955, *S. Yamamoto, 27155* (KYO). Fukuoka: Hakozaki, 11 Apr. 1932, *S. Hatushima, s.n.* (KYO). Kagoshima: Ohsumi, Tokara Isls., Tokara Isl., 8-11 May 1963, *S. Sako 4458* (KYO); Ohshima-gun, along Kokachi-gawa, Uken-mura, Isl. Amami-Oshima, 100 m in alt., 14 Mar. 1986, *G. Murata 56316* (KYO).

Notes: This species is variable in leaf shape. Plants with pectinate-pinnatifid leaves are often found and classified as f. *dissecta* (or var. *dissecta*).

Sect. *Chinenses* (Tzvel.) Pak et Kawano, **comb. et stat. nov.**

Syn. *Ixeris* Cass. sect. *Ixeridium* A. Gray, Mem. Amer. Acad. Arts 6: 397 (1859) p. p.; Kitam., Bot. Mag. (Tokyo) 49: 281 (1935), p. p.

Ixeridium (A. Gray) Tzvel. sect. *Chinensia* Tzvel., Fl. URSS 29: 388 (1964).

Type: *Ixeris chinensis* (Thunb.) Kitagawa

Perennial herbs; stems erect 20-40 cm in height; naked or single-leaved; heads with 16-

41 ligules; achenes fusiform, 10-alata; its beaks nearly as long as the achene body.

Notes: The species referred to this section no doubt belong to the genus *Ixeris* (*sensu* Pak and Kawano) rather than to *Ixeridium*. They are characterized by having slightly winged achenes with white pappus, and numerous ligules per head, ranging from 16-41. Costae of achenes possess 1-2 fiber-sclereid cell layers. The basic chromosome number of this group is $x = 8$ of small relative size (Pak and Kawano, 1990b).

Key to the species

- 1a. Outer involucre bracts equal.
- 2b. Radical leaves few; flowers white-purplish. *I. strigosa*
- 2a. Radical leaves many; flowers yellow or purplish.
- 3a. Radical leaves linear. *I. graminifolia*
- 3b. Radical leaves oblanceolate. *I. chinensis*
- 1b. Outer involucre bracts somewhat unequal.
- 4a. Ligules 28-41 in number; inner bracts 9-10 in number. *I. tamagawaensis*
- 4b. Ligules 16-23 in number; inner bracts 8 in number. *I. riparia*

2. *Ixeris chinensis* (Thunb.) Kitag., Bot. Mag. (Tokyo) 48: 113 (1934); Lauener, Notes Roy. Bot. Gard. Edinb. 23: 390 (1976).

2a. Subsp. *chinensis*.

Syn. *Prenanthes chinensis* Thunb., Fl. Jap. 301 (1784) p. p.

Chondrilla chinensis (Thunb.) Poir., Encyl. Suppl. 2: 331 (1811).

Youngia chinensis (Thunb.) DC., Prodr. 7: 194 (1838).

Ixeris versicolor sensu Benth., Fl. Hongk. 198 (1861), non DC.

Lactuca rubrolutea Vaniot, Bull. Acad. Int. Géogr. Bot. 12: 317 (1903).

Lactuca flavissima Hayata, Icon. Pl. Formos. 8: 78, f. 31-3 (1919).

Lactuca taitoensis Hayata, Icon. Pl. Formos. 8: 71, f. 31-2 (1919).

Lactuca lacerrima Hayata, Icon. Pl. Formos. 8: 71, f. 31-2 (1919).

Lactuca chinensis sensu Yamamoto, J. Soc. Trop. Agric. 8: 351 (1931).

Lactuca lacerrima f. *flavissima* (Hayata) Kitam., Acta Phytotax. Geobot. 1: 152 (1932).

Lactuca lacerrima var. *saxatilis* Kitam., Acta Phytotax. Geobot. 1: 152 (1932).

Lactuca chinensis sensu Chang, Contr. Biol. Lab. Chin. Ass. Adv. Sci. 9: 127 (1934), p.p.

Ixeris chinensis f. *taitoensis* (Hayata) Yamamoto, J. Soc. Trop. Agric. 8: 352 (1935).

Ixeris chinensis var. *saxatilis* (Kitam.) Kitam., Bot. Mag. (Tokyo) 49: 283 (1935).

Ixeris chinensis f. *lacerrima* (Hayata) Yamamoto, J. Soc. Trop. Agric. 8: 351 (1936).

Ixeris tamagawaensis sensu Kitam., Acta Phytotax. Geobot. 10: 24 (1941), p.p.

Ixeris lacerrima (Hayata) Kitag., J. Jap. Bot. 36: 245 (1961).

Distribution: Cambosia, Laos, Thailand, Vietnam, China, Korea, Taiwan, Japan (Okinawa), USSR (Kitamura 1956; Tzvelev, 1964).

Chromosome number: $2n=16$ (Peng and Hsu, 1978; Pak and Kawano, 1990), $2n=18$ (Peng and Hsu, 1978).

Selected specimens examined. LAOS. entre Vientian et Xienkhang, Nov. 1953, *H. Hamada* (KYO).

CHINA. Tsengshing Dist., Sai Fu Mak Tsz, 4 May 1932, *W. T. Tsang* 20425 (KYO). **MONGOLIA.** Ulan Bator and vicinity, 26 Jul. 1970, *C. Jeffrey* 1409 (KYO). **KOREA.** Kyongsangbuk-do, Youngchon-gun, Silrong, Palgongsan, 5 May 1988, *J.-H. Pak* 679-2 (KYO). **TAIWAN.** Chiayi: Tung-pu to Yu-shan, Chien-shan, 2500 m-2800 m in alt., 29 Sept. 1968, *C. Hsu & R. Hsu* 3968 (TAI). Taipei: Shih men to Yeh-lior, littoral, *C. Hsu & R. Hsu* 3884 (TAI); Sec. 3. Keelung Road, 18 Mar. 1968, *C. Hsu* 4329 (TAI); N. T. U. Farm, 25 Dec. 1975, *C.-I. Peng* 2574 (TAI). Taitung: Tah-wu to Tsu-suci-po, 20 m in alt., 31 Jul. 1967, *C. Hsu* 3414 (TAI). Hualien: en route from Chongde to Wenshan, limestone crevices at the roadside, May 3, 1961, *T. Shimizu* 12639 (KYO); Goon, March 13, 1932, *Tatewaki et Kitamura* (holotype of *Lactuca lacerrima* var. *saxatilis*). Nan-tou: Mt. Neng-kao, between Yun-hai (Onoe) and Tien-chih (Noko). On dry place, 2000m in alt., Aug. 11, 1964, *M. Tamura et H. Koyama* 23282 (KYO). **JAPAN.** Okinawa: Insula Okinawa, May 1923, *Miyasato* (KYO); Nakagami-gun, Gushicha-mura, Akanou, March 18, 1934, *M. Tawada* 46 (KYO); Nakagami-gun, Ginowan-mura, Futenma, Jan. 16, 1938, *Y. Taira* 164 (KYO).

Notes: This wide-ranging species, *Ixeris chinensis*, is exceedingly polymorphic, and thus various infraspecific taxa have been described; the leaf shape, its dissection and hairiness vary to a considerable degree. We regarded here, however, that var. *saxatilis* and f. *taitoensis* f. *lacerrima* all represent some extreme forms of such variations. Since *I. chinensis* (including both subsp. *chinensis* and subsp. *versicolor*) is an exceedingly variable species, further detailed studies are needed to reveal the total range of variation of this taxon in relation to its geographical ranges, underlying ecological conditions, and also population structures.

2b. Subsp. *versicolor* (Link) Kitam., Bot. Mag. (Tokyo)49: 283 (1935); Lauener, Notes Roy. Bot. Gard. Edinb. 23: 390 (1976).

Syn. *Prenanthes graminea* Fisch., Mém. Soc. Nat. Mosc. 3: 67 (1812)

Lagoseris versicolor Fisch. ex Link, Enum. Hort. Berol. Alt. 2: 289 (1822).

Barkhausia versicolor (Link) Spreng., Syst. Veg. 3: 651 (1826).

Prenanthes versicolor Fisch. ex Bunge, Mém. Sav. Etrang. Acad. Sci. St.-Pétersb. 2: 114 (1833).

Ixeris versicolor (Link) DC., Prodr. 7: 151 (1838).

Lactuca versicolor Sch.-Bip. ex Herder, Fl. Radd. 3: 29 (1870).

Lactuca (Chorisma) crepidioides Vaniot, Bull. Acad. Int. Géogr. Bot. 12: 244 (1903)

Crepis pseudovirens H. Lév., Fedde, Repert. Spec. Nov. Reg. Veg. 11: 306 (1912).

Crepis taraxacifolia Thuill. var. *vanioti* H. Lév., Fedde, Repert. Spec. Nov. Reg. Veg. 11: 306 (1912).

Lactuca hallaisanensis H. Lév., Fedde, Repert. Spec. Nov. Reg. Veg. 12: 100 (1913).

Ixeris chinensis sensu Nakai, Fl. Sylv. Kor. 14: 113 (1923), non Nakai in 1922.

Lactuca chinensis sensu Chang, Contr. Biol. Lab. Chin. Ass. Adv. Sci. 9: 127 (1934), p.p.

Ixeris chinensis subsp. *hallaisanensis* (H. Lév.) Kitag., J. Jap. Bot. 36: 244 (1961).

Ixeridium gramineum (Fisch.) Tzvel., Fl. URSS 29: 391 (1964).

Distribution: Cambosia, Laos, Thailand, Vietnam, China, Korea, USSR (Kitamura, 1956; Tzvelev, 1964).

Chromosome number: Unknown.

Selected specimens examined. CHINA. Szechuan: Chengtu, Wang-kiang lau, at roadside, fls purple, 5 May 1943, *W. P. Fang* 19225 (KYO). KOREA. Kannan: Genzan, Aug. 7, 1932, *S. Kitamura* (KYO); Mt. Chiisan, Sept. 10, 1935, *S. Okamoto* 16194 (KYO).

3. *Ixeris graminifolia* (Ledeb.) Kitag., Rep. First Sci. Exped. Mansh. Sect. 4, 4: 95 (1936). Syn. *Crepis graminifolia* Ledeb., Mém. Acad. Sci. St.-Pétersb. 5: 558 (1814).

Ixeris versicolor sensu Ledeb., Fl. Ross. 2: 817 (1846), p.p., non DC.

Ixeris chinensis subsp. *graminifolia* (Ledeb.) Kitag., Lineam. Fl. Mansh. 453 (1939).

Ixeris chinensis subsp. *graminifolia* var. *intermedia* Kitag., Rep. Inst. Sci. Res. Mansh. 4: 87 (1940).

Ixeridium graminifolium (Ledeb.) Tzvel., Fl. URSS 29: 392 (1964).

Distribution: China, USSR (Tzvelev, 1964).

Chromosome number: Unknown.

Specimens examined. CHINA. Manchuria: Chonan, 26 Jul. 1931, *M. Kitagawa s.n.* (TI); Goanan-sho: Saikagouki, 1 Jun. 1939, *M. Kitagawa s.n.* (holotype of *Ixeris chinensis* var. *intermedia* -TI).

4. *Ixeris riparia* (Kerr) Stebb., J. Bot. 75: 51 (1937).

Syn. *Lactuca riparia* Kerr, Kew Bull. 355 (1935).

Distribution: Thailand.

Chromosome number: Unknown.

Specimens examined. THAILAND. Ubon Chanuman, on banks of Me Kong, *Kerr* 8386 (holotype-K)

5. *Ixeris strigosa* (H. Lév. et Vaniot) Pak et Kawano, **comb. nov.**

Syn. *Lactuca strigosa* H. Lév. et Vaniot, Bull. Acad. Int. Géogr. Bot. 20: 114 (1909).

Ixeris chinensis subsp. *strigosa* (H. Lév. et Vaniot) Kitam., Bot. Mag. (Tokyo) 49: 283 (1935).

Ixeris chinensis var. *strigosa* (H. Lév. et Vaniot) Ohwi, Fl. Jap. 1246 (1953); Bull. Nat. Sci. Mus. 33: 90 (1953).

Ixeris chinensis subsp. *versicolor* f. *strigosa* (H. Lév. et Vaniot) Kitag., J. Jap. Bot. 36: 244 (1961).

Ixeridium strigosa (H. Lév. et Vaniot) Tzvel., Fl. URSS 29: 390 (1964).

Prenanthes chinensis Thunb., Fl. Jap. 301 (1784), p.p.

Distribution: China, Korea, Japan, USSR (Kitamura, 1956; Tzvelev, 1964).

Chromosome number: $2n=24$ (Pak and Kawano, 1990), $2n=32$ (Babcock et al., 1937; Ishikawa, 1921; Pak and Kawano, 1990).

Selected specimens examined. KOREA. Kyungpook (Kei-hoku-do): Yung-il-gun, near Po-gyeong-sa, Chong-ha, Song-la-Myeon, north of Po-hang, 300m in alt., May 10, 1980, *J.-H. Pak* (KYO); Mt. Kongo, Kogendo, June 10, 1932, *J. Ohwi* (KYO). JAPAN. Aomori: Misawa City, Rokkawame, east coast of Shimokita Peninsula, at the sea level, 7 Jun. 1977, *K. Mimoro et al.* 3713 (KYO). Iwate: Shimohei-gun, Iwaizumi-cho, Mt. Ureira, June 9, 1957, *T. Shimizu* 01765 (KYO). Yamagata:

Nishimurayama-gun, Mt. Asahi, Aug. 17, 1931, *M. Kato* 4518 (KYO). **Fukushima:** Nishishirakawa-gun, Koseki-mura, July 4, 1936, *N. Imai* (KYO). **Nagano:** Mt. Yatsugadake, July 11, 1944, *G. Nakai* 1720 (KYO); Minamitsuru-gun, Kenmarubi, Yoshida, 840m in alt., May 28, 1962, *G. Murata* 16242 (KYO); Minamisaku-gun, Kawakami-mura, Senjyogahara, Azusayama, ca. 1500 m in alt., 25 May 1963, *M. Hotta* 12163 (KYO). **Gifu:** Doki-gun, Tsumaki-cho, Ohodaira, May 23, 1937, *K. Shioda* 685 (KYO). **Nara:** Mt. Kongo, Nov. 24, 1925, *M. Hara* (KYO). **Shiga:** Koga-gun, Iido-yama, May 9, 1937, *C. Matsumoto* 4232 (KYO). **Yamaguchi:** Akiyoshidai, June 29, 1959, *K. Iwatsuki* 4502 (KYO). **Okayama:** Niimi City, en route from Yukawa to Hanaki, 200-300 m in alt., fls. white, *N. Fukuoka* 10301 (KYO). **Ehime:** Niihama City, Ohshima, May 3, 1964, *H. Ishikawa* 71 (KYO). **Kochi:** Takaoka-gun, Kusaka-mura, April 18, 1935, *T. Yoshinaga* (KYO). **Fukuoka:** Kitakyushu City, Hirao-dai, May 5, 1977, *T. Yahara* 4355 (KYO). **Kumamoto:** Kamimashiki-gun, Mihume-cho, June 6, 1958, *Y. Shimada* 11211B (KYO).

Notes: *Ixeris strigosa* is clearly distinguishable from *Ixeris chinensis* by having erect stems, a few radical leaves, and whitish ligules with slightly purplish outer surfaces. The color usually does not change and remains as it is throughout the flowering period.

6. *Ixeris tamagawaensis* (Makino) Kitam., Acta Phytotax. Geobot. 9: 115 (1940); l.c., 10: 24 (1941).

Syn. *Lactuca tamagawaensis* Makino, Bot. Mag. (Tokyo) 6: 56 (1892), nom. nud.; Bot. Mag. (Tokyo) 17: 90 (1903).

Lactuca versicolor Sch-Bip. var. *arenicola* (Makino) Makino, Bot. Mag. (Tokyo) 22: 44 (1898), cum descrip.

Ixeris graminea sensu Nakai, Bot. Mag. (Tokyo) 35: 23 (1922), p. p., quoad syn., non Fisch.

Distribution: Japan.

Chromosome number: $2n=16$ (Nisioka, 1956; Pak and Kawano, 1990).

Selected specimens examined. JAPAN. **Nagano:** Kamiina-gun, Hasemura, en route from Tankei-sanso to Todai, N foot of Mt. Senjyo, 1000-1500 m in alt., 8 Aug. 1973, *N. Kurosaki* 5195 (KYO); Miwa-mura, inter Todai et Kitazawa-toge, 1300 m in alt., 5 Sept. 1954, *Murata* 8178 (KYO). Matsumoto City, 10 Aug. 1987, *J.-H. Pak* 902 (KYO); Shimoina-gun, Yanabuki-mura, Rv. Tenryu, 450 m in alt., 1958, *K. Asano* 10050 (KYO); Kamiina-gun, Kamikatagiri-mura, Matsukawa-dani, Mt. Nenjyo, 29 Jul. 1952, *Murata* 5847 (KYO); **Shizuoka:** Shizuoka City, Hikage-zawa, Abe River, ca. 700-1100 m in alt., 14 Aug. 1975, *Y. Kamijo et al.* 414 (KYO); Ohkohchi, Abegawa River valley, 400 m in alt., 20 May 1955, *T. Koyama* 6993 (KYO). **Tokyo:** Hachiohji City, Katakura, 1 May 1971, *N. Naruhashi* 3116 (KYO).

Sect. *Chorisis* (DC.) A. Gray, Mem. Amer. Acad. Arts 6: 397 (1859).

Syn. *Corisis* DC., Prodr. 7: 177 (1838); Tzvel., Fl. URSS 29: 393 (1964).

Lactuca sect. *Chorisma* Benth., in Benth. et Hook. 2: 526 (1873).

Type: *Ixeris repens* (L.) A. Gray.

Perennial herbs; stems repens, scapose or scapiform; leaves palmate; heads few; outer involucre bracts prominent; achenes large, 7-8 mm in length, 1-1.5 mm in width.

7. *Ixeris repens* (L.) A. Gray, Mem. Amer. Acad. Arts 6: 397 (1859).

Syn. *Prenanthes repens* L., Sp. Pl.:798 (1753).

Chorisia repens (L.) DC., Prodr. 7: 178 (1838).

Nabulus repens (L.) Ledeb., Fl. Ross. 2: 840 (1846).

Lactuca repens (L.) Benth. ex Maxim., Mém. Biol. Bull. Phys.-Math. Acad. Imp. Sci. St.-Pétersb. 9: 364 (1874).

Distribution: Cambosia, Laos, Thailand, Vietnam, China, Japan, Kamtschatka, Korea, Taiwan, USSR (Kitamura, 1956; Tzvelev, 1964).

Chromosome number: $2n=16$ (Ishikawa, 1921; Jinno, 1953; Asano, 1960; Nishikawa, 1984; Pak and Kawano, 1990).

Selected specimens examined. JAPAN. Hokkaido: Prov. Kitami, Shari-cho, Shari, on the sandy grassy place near the seashore, 4 Sept. 1965, *N. Naruhashi 1130* (KYO); on the coast of Okhotsk, the sea level, *T. Koyama et al. 67* (KYO); between Hamakoshimizu and Yanbetu, in the grasslands, 1 Sept. 1959, *M. Hotta 10110* (KYO); Kushiro City, west part of Kushiro, sandy bare ground in reclaimed sea, 3 m in alt., 23 Jul. 1981, *K. Takita 570* (KYO); Shari-gun, Koshimizu-cho, Hamakoshimizu, 9 Jul. 1962, *A. Nitta 10169* (KYO); Tobai, west of Nemuro City, in the coastal region near Furen-ko, 29 Aug. 1961, *N. Kitagawa 6309* (KYO); Hiroo-gun, Taiki-cho, west of Oikomanai pond, ca. 0-30 m in alt., 28 Jul. 1979, *E. Miki & M. Ito 69* (KYO). **Aomori:** Kamikita-gun, Rokkasho-mura, the mouth of the river Takase, 10 Aug. 1973, *T. Naito et al. s.n.* (KYO); Kitatsugaru-gun, Shiura-mura, near Lake Jusan, on the sandy beach, 1 Jun. 1978, *S. Terabayashi 278* (KYO); Nishitsugara-gun, near the seashore of Ajigasawa, ca. 5 m in alt., on the sandy seashore, 7 Jun. 1978, *E. Miki 1092* (KYO). **Iwate:** Kunoe-gun, Noda, Nodamura, on sandy coast, 27 Jul. 1967, *G. Murata & H. Tabata 13* (KYO). **Miyagi:** Sendai City, Gamo, 15 Jun. 1972, *T. Naito 726151* (KYO). **Niigata:** Santo-gun, Kan'wa-mura, vicinity of Arahama, 30 May 1977, *Murata et al. 31569* (KYO); Nishikubiki-gun, Utatonami-mura, the seacoast at Oyashirazu, 8 Oct. 1960, *M. Hiroe, 14506* (KYO). **Chiba:** Ichinomiya in Kazusa, 29 Oct. 1957, *N. Maruyama & K. Okamoto 1607* (KYO); Awa-gun, Nishimisaki-mura, Mimono, 5 m in alt., 21 Nov. 1965, *H. Kanai et al. s.n.* (KYO); along the shore of Tateyama City, 27 Oct. 1966, *M. Hiroe 17221* (KYO). **Tokyo:** Izu-ohshima, Mt. Mihara, 2 Sept. 1967, *M. Hiroe 18403* (KYO). **Kanagawa:** Sagami, Chigasaki, 3 Jun. 1951, *K. Okamoto 239* (KYO). **Kyoto:** Kumano-gun, Kumihama-cho, Hakoishi, on sandy coast, 26 Jun. 1965, *G. Murata & H. Koyama 35* (KYO). **Osaka:** Sennan-gun, Sennan-cho, between Okada and Tarui, sandy beach, 30 May 1961, *K. Seto 10607* (KYO). **Hyogo:** Kinokuni-gun, Kasumi-cho, en route from Hamayasugi to Kundani, near the sea, on the sandy beach, 5 Jun. 1981, *N. Fukuoka 11055* (KYO); Mitaka-gun, Hamasaka-cho, en route from Yajyogahama to Moroyose, on the sandy coast, 2-100 m in alt., 20 Aug. 1983, *N. Kurosaki 13685* (KYO); Awaji, Goshikigahama to Keinohama, Isl. Awaji, the sea coast, 20 Dec. 1961, *G. Murata 15507* (KYO). **Shimane:** Izumo City, Sotozono-cho, Nagahama-seaside, 30 Sept. 1982, *K. Mimoro & S. Tsugaru 3376* (KYO). **Tottori:** Inaba, at the seashore, 22 Jul. 1958, *G. Murata 11436* (KYO); on the Tottori-dune, 25 Jul. 1958, *I. Shimizu 3637* (KYO); Tottori City, Hamasaka-dune, 19 Jul. 1969, *A. Nitta 12492* (KYO). **Kochi:** Tatsukushi, Tosashimizu City, 30 Mar. 1963, *G. Murata 17890* (KYO). **Kagoshima:** Isl. Yakushima, Kamiyaku-cho, Nagakubo, on the sandy and stony sea coast, 8 Apr. 1984, *G. Murata & H. Koyama 44777* (KYO); Isl. Yakushima, Yaku-cho, between Hinokuchi and Hirano, along the sea coast, 10 Apr. 1984, *Yahara et al. 9129* (KYO); Isl. Tokunoshima, Ohshima-gun, Isen-cho, Kinen, sea level, 23 Aug. 1975, *Iwatsuki et al. 6* (KYO). **Okinawa:** near Hentona, along the seashore, 28 Jul. 1951, *E.*

H. Walker et al. 7155 (KYO).

Sect. *Pseudo-chorisis* Kitam., Bot. Mag. (Tokyo) 49: 287 (1935).

Type: *Ixeris stolonifera* A. Gray.

Perennial herbs with elongate stolons; stems scapose or scapiform; leaves spathulate; heads few; outer involucre bracts prominent; achenes fusiform, 10-winged, with a long beak.

Key to the species

- 1a. Involucres 12-14 mm long; leaves oblanceolate to spathulate-elliptic; achenes 8.2-9.8 mm wide. *I. debilis*
- 1b. Involucres 8-10 mm long; leaves ovate-orbicular, broadly ovate to broadly elliptic; achenes 5.0-8.3 mm wide. *I. stolonifera*

8. *Ixeris debilis* (Thunb.) A. Gray, Mem. Amer. Acad. Arts 6: 397 (1859); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 23: 126 (1956).

8a. Subsp. *debilis*.

Syn. *Prenanthes debilis* Thunb., Fl. Jap. 300 (1784).

Chondrilla debilis (Thunb.) Poir., Encyl. Supp. 2: 332 (1811).

Youngia ? debilis (Thunb.) DC., Prodr. 7: 194 (1838).

Lactuca debilis (Thunb.) Benth. ex Maxim., Mém. Biol. Bull. Phys.-Math. Acad. Imp. Sci. St.-Petersb. 9: 365 (1874).

Lactuca debilis f. *sinuata* (Franch. et Savat.) O. Kuntze, Rev. Gen. Pl. 1: 349 (1891).

Ixeris japonica f. *dissecta* Nakai, Bot. Mag. (Tokyo) 40: 576 (1926).

Ixeris japonica sensu Nakai, Bot. Mag. (Tokyo) 40: 575 (1926), non N. L. Burm.

Distribution: China, Japan, Korea, Taiwan (Kitamura, 1956).

Chromosome number: 2n=24 (Ishikawa, 1921), 2n=48 (Takemoto, 1952; Hsu, 1978; Pak and Kawano, 1990)

Selected specimens examined. **KOREA.** Chollanamdo: Mokpo City, Dalri-do, 100 m in alt., 12 May 1987, *J.-H. Pak* 780 (KYO). **JAPAN.** **Aomori:** Kitatsugaru-gun, Shiura-mura, Jusan, Tsugaru Peninsula, near Lake Jusan, on the sandy beach, 10 Jun. 1978, *S. Terabayashi* 271 (KYO); Higashitsugaru-gun, Kanita-cho, en route from Kainita to Shikoshi, on the sunny moist roadside, 8 Jun. 1978, *E. Miki* 1063 (KYO). **Akita:** Oga City, Monzen, in the sunny plain on the slope against the sea, 6 Jun. 1978, *M. Ito* 370 (KYO). **Iwate:** Oh-hunato City, Goishi-kaigun, 20 m in alt., 21 Jun. 1967, *H. Koyama & M. Hotta* 2027 (KYO). **Miyagi:** Sendai City, Kawauchi, 26 May 1972, *I. Sato* 72526 (KYO). **Niigata:** Kashiwazaki City, Kujirahama, Shojyodo, on the clay slope of the grassy coast, 30 May 1977, *Murata et al.* 31587 (KYO). **Toiyama:** Himi City, Kosakai, 10 May 1969, *G. Murata et al.* 38 (KYO). **Saitama:** Kodama-gun, Kamiizumi-mura, north slope of Mt. Jyominesan, 400-550 m in alt., *J. Murata* 1710 (KYO). **Shizuoka:** Izu, Susaki Goyotei, 10 Apr. 1979, *S. Kitamura* 11 (KYO). **Gifu:** Gujo-gun, Minami-mura, en route from Fukuno to Kamagataki, 150-300 m in alt., 5 May 1982, *N. Kurosaki* 12535 (KYO). **Aichi:** Chita-gun, the Island of Shinojima, ca. 1-5 m in alt., 21 May 1974, *H. Takahashi* 2145 (KYO). **Mie:** Suzuka-gun, Ogisu, ca. 200 m in alt., 21 Apr. 1961, *Kitagawa s.n.* (KYO). **Kyoto:** Nishikyo-ku, Oharano, 9 May 1983, *K. Nagai* 24754 (KYO). **Osaka:** Misaki-machi, Tanagawakojima, on the rocky beach, 11 May 1981, *K. Tsuchiya* 1543 (KYO).

Hyogo: Sanda City, en route from Inada Yokawa-cho to Hirano, 150-200 m in alt., 21 May 1981. *N. Fukuoka 11044* (KYO). **Shimane:** Isl. Oki, Oki-gun, Goka-mura, Nagoda, on the sunny place of the pebbly coast by rocky cliffs, 17 May 1986, *G. Murata et al. 45926* (KYO). **Kochi:** Shiraoyama near Ashizurizaki, 100 m in alt., 29 Mar. 1963, *G. Murata 17845* (KYO). **Kagoshima:** Isl. Yakushima, Kumage-gun, Yaku-cho, Nagakubo, by the sea shore, 14 Apr. 1981, *K. Deguchi 4709* (KYO); Isl. Yakushima, Yaku-cho, between Hinokuchi and Hirano, along the sea coast, 10 Apr. 1984, *T. Yahara et al. 9135* (KYO); Isl. Yakushima, Kamiyaku-cho, Shidoko, on the sunny coast, 12 Apr. 1984, *G. Murata & H. Koyama 44916* (KYO).

Notes: This species is very variable in leaf shape. Plants with pinnately lobed or pinnately partite leaves are often found, and classified as f. *sinuata* or f. *dissecta*.

8b. Subsp. *litoralis* Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 23: 126 (1956).

Syn. *Ixeris japonica* subsp. *litoralis* Kitam., Acta Phytotax. Geobot. 3: 132 (1934).

Ixeris debilis sensu Benth., Fl. Hongk. 193 (1861), p.p., non Thunb.

Lactuca trifida Kitam., Acta Phytotax. Geobot. 1: 58 (1932).

Ixeris japonica var. *salsuginosa* (Kitag.) Kitag., Bot. Mag. (Tokyo) 48: 113 (1934).

Ixeris japonica subsp. *trifida* (Kitam.) Kitam., Bot. Mag. (Tokyo) 49: 288 (1935).

Ixeris japonica subsp. *salsuginosa* Kitag., Lineam. Fl. Manch. 454 (1939).

Distribution: China, Taiwan (Kitamura, 1956).

Chromosome number: Unknown.

Selected specimens examined. CHINA. Manchuria: Fengtsien, Loohutan, May 23, 1932, *M. Kitagawa* (KYO). **TAIWAN. Taipei:** Tamsui, 19 Jan. 1932, *Kitamura S. s.n.* (holotype-KYO). Shinchiku: Rochiku, Koshiko, *Shimoda Y. 4385B* (holotype of *Lactuca trifida* - KYO); Chinshan, on the sunny sea coast, 11 Aug. 1979, *Murata G. & H. Nishimura 31203* (KYO). **JAPAN. Okinawa:** Isls. Yaeyama, Isl. Hateruma, 0-50m in alt., March 29, 1979, *H. Okada et K. Ueda 2011* (KYO); Nago City, Kushi, Kinbu, Feb. 27, 1912, *T. Miyagi 203* (KYO).

8c. Subsp. *liukiuensis* Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 23: 127 (1956).

Distribution: Japan.

Chromosome number: Unknown.

Selected specimens examined. CHINA. Kiangsu: Shanghai, Cheling, June 18, 1933, *H. Migo 135* (KYO); Sunkiang, June 11, 1933, *H. Migo 137* (KYO); Chwansha, May 21, 1933, *H. Migo 136*. **JAPAN. Okinawa:** Shimaziri-gun, Izena-jima, Yanoshita-jima, 20 Apr. 1984, *Y. Shimizu 84-133* (KYO); Kunigami-gun, Ohgimi-mura, Jan. 23, 1938, *T. Kinjyo 477* (holotype-KYO); Yaeyama-gun, Isl. Iriomote, Taketomi-cho, en route from Funaura port to Hinai-fall, along Hinai River. In mangrove forests. March 8, 1982, *Kato et al., 58* (KYO); Isls. Yaeyama, Isl. Ishigaki, en route from Osato to Hakubo, Mar. 11, 1980, *H. Okada et K. Ueda 2890* (KYO); Isls. Izena, Yanoshita-jima, near the beach. Apr. 20, 1984, *T. Shimizu 84-133* (KYO); Isl. Amami-ohshima, Tatsugo-mura, at the vicinity of Ankyabe, along the sandy beach, Apr. 12, 1970, *N. Fukuoka 8013* (KYO). **Kagoshima:** Isl. Okinoerabujima, April 10, 1927, *S. Miki* (KYO); Ohshima-gun, Isl. Yoronjima, Mar. 29, 1966,

N. Kurosaki 1368 (KYO).

9. *Ixeris stolonifera* A. Gray, Mem. Amer. Acad. Arts 6: 396 (1859).

Syn. *Lactuca stolonifera* (A. Gray) Benth. ex Maxim., Mém. Biol. Bull. Phys.-Math. Acad. Imp. Sci. St.-Petersb. 9: 364 (1874).

Lactuca nummularifolia H. Lév. et Vaniot, Feddes Repert. Spec. Nov. Reg. Veg. 8: 421 (1910).

Lactuca stolonifera var. *sinuata* Makino, J. Jap. Bot. 3: 42 (1926).

Ixeris capillaris Nakai, Kamikochi Tennen-Kinenbutsu-Chosa-Hokoku, 41 (1928).

Ixeris stolonifera subsp. *capillaris* (Nakai) Kitam., Bot. Mag. (Tokyo) 49: 287 (1935).

Ixeris stolonifera var. *sinuata* (Makino) Takeda, Kozan-Shokubutsu-Dui ed. 2, pl. 19 (1937).

Ixeris stolonifera f. *sinuata* (Makino) Ohwi, Fl. Jap. 1246 (1953); Bull. Nat. Sci. Mus. 33: 90 (1953).

Ixeris stolonifera f. *capillaris* (Nakai) Ohwi, Fl. Jap. 1246 (1953); Bull. Nat. Sci. Mus. 33: 90 (1953).

Distribution: China, Japan, Korea, Taiwan (Kitamura, 1956).

Chromosome number: $2n=16$ (Babcock et al., 1937; Takemoto, 1952; Lee 1971; Nishikawa, 1979; Pak and Kawano, 1990).

Selected specimens examined. **JAPAN. Hokkaido:** Nakagawa-gun, Tokiwa-mura, vicinity of Otoineppu, Hokkaido Univ. Exp. For., in mixed forests, 100 m in alt., 23 Jun. 1978, *G. Murata 38425* (KYO); Rumoi, Tomamae-gun, Tomamae-cho, vicinity of Iwami, on the edge of forests along the road, 25 Jun. 1978, *G. Murata et al. 38770* (KYO); Sorachi, Uryu-gun, Uryu-cho, at the lower elevation of Mt. Minamishokanbetsu-dake, by the stream in deciduous forests, 600 m in alt., 26 Jun. 1978, *G. Murata et al. 38674* (KYO). **Aomori:** Aomori City, Matsubara, by the river side, the sea level, 5 Jun. 1977, *K. Mimoro et al. 3543* (KYO). **Akita:** Ogachi-gun, Minase-mura, at the foot of Mt. Kurikoma, Hanayama-toge, 620-742 m in alt., 7 Jul. 1988, *T. Nemoto & H. Hoshino 4510* (KYO). **Miyagi:** Mt. Abukuma, Mafune-toge, ca. 100-250 m in alt., 25 Jun. 1986, *J. Iketsu, et al. 505* (KYO). **Yamagata:** Nishimurayama-gun, Nishikawa-machi, en route Mazawa-rindo, on the road side 240 m in alt., 4 Jun. 1986, *S. Tsugaru & T. Takahashi 6579* (KYO). **Nagano:** Mt. Shirouma, between Yari-onsen and Sarukura, on the sunny stony cliff, 1850 m in alt., 22 Jul. 1980, *T. Yamazaki 2499* (KYO); Shimoina-gun, Ohshika-mura, en route from Koshibuyu to Hiragawara, on the dry river bed in open places, 700-1000 m in alt., 30 Aug. 1963, *K. Iwatsuki & H. Koyama 71* (KYO). **Tokyo:** Musashi, in the cultivated field, 7 May 1955, *U. Mizushima 12251* (KYO). **Kanagawa:** Sagami, Hakone, 31 May 1952, *J. Ohwi & K. Okamoto 510* (KYO); Minamiashigara City, S. of Kintoki-yama on the road side between Miyomoshita and Gotanba, 1000 m in alt., 15 Feb. 1947, *J. J. Wordack s.n.* (KYO). **Yamanashi:** Tsuru City, at the foot of Mt. Mitsutoge, along the road on the open slope, 1000 m in alt., 6 Sept. 1960, *K. Iwatsuki 5192*. **Shizuoka:** Haibara-gun, Honkawane-cho, along the small gorge of west of Mt. Fudou, in mixed woods among brittle rocks, ca. 1500 m in alt., 28 Jul. 1978, *Koyama et al. 59* (KYO); Susono City, Iwanami, SE foot of Mt. Fuji, weedy slope by the roadside, ca 250 m in alt., 7 May 1977, *K. Murata 1016* (KYO); Shuchi-gun, Haruno-cho, Mt. Kyomaru, 300-600 m in alt., 28 Apr. 1972, *G. Murata et al. 75* (KYO); Shizuoka City, Mt. Jumai-san, 1719 m in alt., on route to the Nakano-dam top, 19 Apr. 1975, *Y. Kamijo 43* (KYO); Izu Peninsula, Tagata-gun, Toi-cho, from Toi to Hada, 11 Dec. 1968, *S. Yoshida 113* (KYO). **Gifu:**

Migi-gun, Itadori-mura, Shoro, by the sunny road side, 300 m in alt., 4 May 1982, *N. Kurosaki 12519* (KYO); Takayama City, Shimoho, at the edge of shrubs, ca. 600 m in alt., 8 May 1985, *H. Takano 763* (KYO); Yoshiki-gun, Kamitakara-mura, in the vicinity of Okuhodaka-onsen, in half shade along the stream, 1300 m in alt., 2 Jun. 1977, *G. Murata et al. 32627* (KYO). **Mie**: Inabe-gun, Nishifujiwara-mura, Mt. Fujiwara-dake, 1 May 1955, *G. Murata 8656* (KYO); Ujiyamada City, Mt. Asamayama, 400 m in alt., 12 May 1955, *G. Murata 8725* (KYO). **Shiga**: Sakata-gun, Maibara-cho, from Kaminishi to Kuregahata, in light forests, 300 m in alt., 18 May 1969, *G. Murata 20641* (KYO). **Kyoto**: Kasa-gun, Ohe-cho, Naigu, in mixed forests, on the rocky slope at the edge of forests, ca. 200 m in alt., 2 Jun. 1984, *G. Murata 45035* (KYO); Oheyama, on the sunny roadside, 600 m in alt., 3 Jun. 1984, *G. Murata 45066* (KYO). **Nara**: Gose City, Kongo-san, en route from the summit to Nagara, 450 m in alt., 3 May 1962, *G. Murata 16116* (KYO); interior of Amagase (along Namego), Mt. Ohmine, on the clayey soil by the stream, 30 May 1964, *K. Iwatsuki & H. Koyama 304* (KYO); Yoshino-gun, Mts. Ohmine, en route from Mt. Gyojagaeri to Kawai, 1 Jun. 1970, *M. Hotta et al. 66* (KYO); Kamikitayama-mura, Namego-dani, 500-700 m in alt., 20 May 1987, *S. Tsugaru et al. 8076* (KYO); Kamikawa-mura, inter Kashiwagi et Konodani-gawa, 28 May 1955, *G. Murata & K. Iwatsuki 150* (KYO). **Osaka**: Minoo City, near Kachioji, on the open slope along the way, 29 Apr. 1964, *G. Murata 11561* (KYO). **Hyogo**: Settsu, Rokko-san, 800m. in alt., 5 Jun. 1854, *G. Murata 7172* (KYO); Kobe City, Kita-ku, Nadareo-yama, en route from Hotta-cho to Ohike, 300-530 m in alt., 2 Jun. 1979, *N. Fukuoka & N. Kurosaki 2404* (KYO); Mikata-gun, Onsen-cho, Mt. Ohginosen, in the *Fagus crenata* zone, 26 May 1979, *M. Hashimoto 9314* (KYO); Migata-gun, Onsen-cho, en route from Hatagutaira to Tanaka via Ueyama-kogen, by the path in deciduous forests, 300-920 m in alt., 12 Jun. 1982, *N. Kurosaki 12712* (KYO). **Tokushima**: Kaifu-gun, Kainan-cho, en route Obi to Ogoya, roadside, 250 m in alt., 31 May 1966, *Y. Inamasu 522* (KYO). **Kochi**: Tosashimizu City, between Odo and Ashizurizaki, 29 Mar. 1963, *G. Murata 17790* (KYO); Takaoka-gun, Higashitsuno-mura, between Shinden and Tanono, Ochimen, 23 May 1959, *G. Murata & T. Shimizu 2423* (KYO). **Nagasaki**: Isls. Tsushima, Shimoogata-gun, Mitsushima-cho, en route from Kechi to Mt. Shiratake, on the roadside, 30 Apr. 1978, *E. Miki 859* (KYO); Kamiagata-gun, Mt. Senbyomaki, 200-280 m in alt., 27 Sept. 1968, *H. Koyama 2786* (KYO). **Miyazaki**: Higashiusuki, Shiba-mura, en route from Omae to Omoekoharu, ca. 600 m in alt., 15 May 1962, *M. Hotta 10486* (KYO). **Kagoshima**: Shimokoshiki-zima, en route from Nagahama to Mt. Odake, 500 m in alt., 29 Apr. 1963, *M. Hotta 11832* (KYO); Isl. Yakushima, en route from Ambo to Kosugidani, 11 Aug. 1964, *M. Tagawa & F. Konta 258* (KYO); Isl. Yakushima, along the north coast of Amboo, from Amboo to 2 km., 8 Jan. 1969, *S. Yoshida 244* (KYO); Isl. Yakushima, Kamiyaku-cho, Shidoko, on the sunny coast, *G. Murata & H. Koyama 44915* (KYO). **Okinawa**: Ryukyu, along the bypass near Takushi Urasoe, 18 May 1978, *S. Gima 150* (KYO).

Notes: This species is very variable in leaf shape. Plants with lyrate pinnate-lobed leaves are often found, and classified as *f. sinuata* or *f. capillaris*.

Sect. *Sobolixeris* Nakai, Bot. Mag. (Tokyo) 34: 152 (1920).

Type: *Ixeris longirostrata* (Hayata) Nakai.

Perennial herbs with elongate stolons; stems erect; leaves saggitate, amplexicaul at the base; heads numerous; achenes fusiform, long-beaked.

10. *Ixeris longirostrata* (Hayata) Nakai, Bot. Mag. (Tokyo) 34: 152 (1920).

Syn. *Lactuca longirostrata* Hayata, Icon. Pl. Formos. 8: 78 (1919), f. 31-4.

Distribution: Japan, Bonin Islands.

Chromosome number: $2n=16$ (Ono and Masuda, 1981; Pak and Kawano, 1990).

Specimens examined. JAPAN. Tokyo: Bonin Isls., Chichijima, Ogasawara-mura, the shore of Yakiba, 27 Apr. 1976, N. Fujita & Y. Shimizu 248 (KYO); 23 Sept. 1977, Y. Shimidzu s.n. (KYO); Hahajima, Nankyo, on beach, 13 Mar. 1988, S. Kobayashi et al. 88-1 (KYO).

Ixeridium (A. Gray) Tzvel., Fl. URSS 29: 388 (1964).

Syn. *Ixeris* Cass. sect. *Ixeridium* A. Gray, Mem. Amer. Acad. Arts, 6: 398 (1859), p.p.; Kitam., Bot. Mag. (Tokyo) 39: 281 (1935), p.p.; Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 23: 108 (1956)

Ixeridium (A. Gray) Tzvel. sect. *Dentata*, Tzvel., Fl. URSS 29: 388 (1964).

Type: *Ixeridium dentatum* (A. Gray) Tzvel.

Perennial herbs erect; roots tap-rooted or with short stolon; leaves mainly radical, but with a few or no cauline leaves. Inflorescences terminal, corymbose; heads many with relatively a few florets (5-12); involucre cylindrical, narrow; bracts 2-seriate, glabrous, herbaceous with scarious margins; inner bracts ovate or linear, equal, 5-8 in number, much larger and longer than the outer bracts; outer bracts short, imbricate; receptacles flat, naked; flowers bisexual, ligulate, 5-toothed, yellow, white, or white-purplish. Achenes fusiform, somewhat flattened, equally acute 5-12 ribbed; costae totally composed of only libriform fiber cells; pappus bristles many, slender, scaberulous, white or dirty white. Basic chromosome number: $x=7$ (see Pak and Kawano, 1990b).

Key to the species

- 1a. Pappus white or dirty white.
- 2a. Cauline leaves linear lanceolate. *I. siamense*
- 2b. Cauline leaves sagittate. *I. sagittarioides*
- 1b. Pappus brown.
- 2a. Cauline leaves none; outer involucre bracts ovate.
- 3a. Head solitary; leaves rosular, dense, sessile; stems 1-2.5 cm, high. *I. subacaule*
- 3b. Heads few-many, radical leaves spatulate, subsessile; stems 1-55 cm, high.
- 4a. Involucres 8-11 mm; heads 3-20. *I. pygmaeum*
- 4b. Involucres 5-6 mm; heads 1-2. *I. pusillum*
- 2b. Cauline leaves linear (auriculate); outer involucre bracts linear or lanceolate.
- 5a. Cauline leaves auriculate. *I. dentatum*
- 5b. Cauline leaves linear.
- 6a. Inner involucre bracts 5; florets 5-6.
- 7a. Involucres 4-6 mm; pappus 2.5-3 mm. *I. makinoanum*
- 7b. Involucres 7-8 mm; pappus 5 mm. *I. transnokoense*
- 6b. Inner involucre bracts 8-10 (rare 5); floret 8-11.
- 8a. Radical leaves linear-oblong-lanceolate. *I. gracile*
- 8b. Radical leaves oblong-lanceolate.

- 9a. Radical leaves well-developed rosette, yellowish green.
 10a. Pappus 4-5 mm; thick leaves. *I. laevigatum*
 10b. Pappus 3-3.3 mm; thin leaves. *I. yakuinsulare*
 9b. Radical leaves rosette, whitish green.
 11a. Pappus fewer, 22-32 in number. *I. alpicola*
 11b. Pappus numerous, 39-52 in number. *I. parvum*

1. *Ixeridium alpicola* (Takeda) Pak et Kawano, *comb. nov.*

Syn. *Lactuca thunbergii* *lusus alpicola* Takeda, Bot. Mag. (Tokyo) 24: 70 (1910).

Lactuca dentata a. *flaviflora* subvar. *alpicola* (Takeda) Makino, Bot. Mag. (Tokyo) 24: 75 (1910).

Ixeris alpicola (Takeda) Nakai, Bot. Mag. (Tokyo) 34: 23 (1922).

Ixeris dentata subsp. *alpicola* (Takeda) Kitam., Bot. Mag. (Tokyo) 49: 286 (1935).

Ixeris alpicola var. *tennuissima* Honda, Bot. Mag. (Tokyo) 55: 440 (1949).

Ixeris dentata subsp. *alpicola* var. *tennuissima* (Honda) Hara, Enum. Sperm. Jap. 2: 215 (1952).

Ixeris dentata var. *alpicola* (Takeda) Ohwi, Fl. Jap. 1247 (1953); Bull. Nat. Sci. Mus. 33: 90 (1953).

Distribution. Japan.

Chromosome number: 2n=14 (Nisioka, 1956, 1960, 1963; Pak and Kawano, 1990), 2n=21 (Takemoto, 1962, 1970; Pak and Kawano, 1990), 2n=28 (Takemoto, 1962, 1970; Pak and Kawano, 1990).

Selected specimens examined. JAPAN. Hokkaido: Iburi, Usu-gun, Mt. Tokushunbetsu, 1955, S. Kawano (SAPA); Aug. 13, 1978, M. Hara 13 (KYO); Mt. Orohure, 1951, S. Kawano (SAPA); Ishikari, Numanohara, Sannoike, 1947, M. Tatewaki (SAPA); Mt. Furano, 1947, M. Tatewaki (SAPA); Mt. Niseikaushupe, 1947, M. Tatewaki & J. Samejima (SAPA); Kitami, Mt. Oakan, alt. 1250m in alt., Aug. 7, 1981, K. Takita 697 (KYO). **Nagano:** Nishichiku-gun, Ohkuwa-mura, Kisodonogoshi, North of Mt. Utsugi-dake, 2500 m in alt., 6 Aug. 1964, Y. Inamasu 349 (KYO). **Yamanashi:** Nirasaki City, en route from Mt. Yakushi to Mt. Jizou, 2800 m in alt., 7 Aug. 1978, E. Miki et al. 91 (KYO). **Shizuoka:** Shizuoka City, en route from Mt. Warusawa-dake (3146m) to Mt. Senmai-dake (2879m), July 30-31, 1971, F. Kōta 9449 (KYO).

Notes: Yahara (in Yahara et al., 1987) pointed out that *Ixeridium alpicola* is clearly distinguishable from *Ixeridium dentatum* by having more than 8 inner bracts and fewer pappi. The authors also consider that this typical alpine dwarf plant no doubt constitutes an independent reproductive population, and thus should be separated from a closely related lowland species, *I. dentatum*.

2. *Ixeridium dentatum* (Thunb.) Tzvel., Fl. URSS 29: 392 (1964).

2a. Subsp. *dentatum*.

Syn. *Prenanthes dentata* Thunb., Fl. Jap. 301 (1784).

Youngia dentata (Thunb.) DC., Prodr. 7: 193 (1838).

Ixeris albiflora A. Gray, Mem. Amer. Acad. Arts 6: 397 (1859).

Ixeris thunbergii A. Gray, Mem. Amer. Acad. Arts, 6: 398 (1859).

- Lactuca thunbergii* (A. Gray) Maxim., Bull. Acad. Imp. Sci. St.-Petersb. 19: 530 (1874).
- Lactuca albiflora* (A. Gray) Maxim., Bull. Acad. St.-Petersb. 9: 531 (1874).
- Lactuca thunbergii* var. *albiflora* Makino, Bot. Mag. (Tokyo) 12: 48 (1898).
- Lactuca crepidioides* Vaniot, Bull. Acad. Int. Géogr. Bot. 12: 244 (1903).
- Lactuca dentata* (Thunb.) C. B. Robinson, Philipp. J. Sci., 3: 218 (1908), quoad nom.; Makino, Bot. Mag. (Tokyo) 24: 75 (1910).
- Lactuca dentata* var. *flaviflora* Makino subvar. *thunbergii* Makino, Bot. Mag. (Tokyo) 24: 75 (1910).
- Lactuca dentata* var. *albiflora* Makino, Bot. Mag. (Tokyo) 24: 76 (1910).
- Ixeris dentata* (Thunb.) Nakai, Fl. Sylv. Kor. 14: 114 (1923), ex Kitam., Bot. Mag. (Tokyo) 49: 285 (1935).
- Ixeris dentata* var. *octoradiata* Nakai, Fl. Sylv. Kor. 19: 114 (1923), nom. nud.
- Ixeris dentata* var. *lobata* Nakai, Fl. Sylv. Kor. 19: 114 (1923), nom. nud.
- Ixeris dentata* var. *albiflora* (Makino) Nakai, Fl. Sylv. Kor. 14: 114 (1923), nom. nud., ex Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 23: 118 (1956).
- Ixeris dentata* var. *atropurpurea* Nakai, Bot. Mag. (Tokyo) 42: 16 (1928).
- Lactuca dentata* var. *stolonifera* Kitam., Comp. Nov. Jap. 1: 26 (1931).
- Ixeris dentata* var. *octoradiata* f. *leucantha* H. Hara, J. Jap. Bot. 11: 435 (1934).
- Ixeris dentata* var. *stolonifera* Nemoto, Fl. Jap. Supp. 783 (1935).
- Ixeris dentata* var. *amplifolia* Kitam., Bot. Mag. (Tokyo) 49: 285 (1935).
- Ixeris dentata* subsp. *nikoensis* Kitam., Bot. Mag. (Tokyo) 49: 286 (1935), p.p., quoad syn.
- Ixeris dentata* var. *amplifolia* f. *leucantha* (H. Hara) Kitam., Acta Phytotax. Geobot. 6: 237 (1937).
- Ixeris dentata* var. *leucantha* H. Hara, Bot. Mag. (Tokyo) 52: 121 (1938).
- Ixeris dentata* subsp. *stolonifera* Kitam., Acta Phytotax. Geobot. 9: 116 (1940).
- Ixeris dentata* f. *amplifolia* Hiyama, J. Jap. Bot. 28: 217 (1951).
- Ixeris dentata* f. *atropurpurea* (Nakai) H. Hara, Enum. Sperm. Jap. 2: 214 (1952).
- Ixeris dentata* f. *albiflora* H. Hara, Enum. Sperm. Jap. 2: 214 (1952).

Distribution. China, Japan, Korea, USSR (Kitamura, 1956; Tzvelev, 1964).

Chromosome number: $2n=14$ (Okabe, 1932; Pak and Kawano, 1990), $2n=21$ (Babcock et al., 1937; Ono, 1941; Takemoto, 1954, 1962, 1970; Kawano, 1961; Nisioka, 1956, 1960, 1963; Fujishima, 1984; Pak and Kawano, 1990), $2n=28$ (Pak and Kawano, 1990).

Selected specimens examined. JAPAN. Nagano: Kiso-gun, Agematsu-cho, Akazawa, 1100-1200 m in alt., 21 Jul. 1984 *G. Murata et al.* 042 (KYO). Shizuoka: Fujinomiya City, Yokotezawa in the vicinity of Shraitono-taki fall, at the western foot of Mt. Fuji, ca. 500 m in alt., 17 May 1977, *G. Murata & S. Kusaka* 1073 (KYO). Shiga: Ohmi, Katada-cho, May 24, 1931, *S. Kitamura* (holotype of *Lactuca dentata* var. *stolonifera*) (KYO). Kyoto: Mt. Hiei, June 26, 1932, *S. Kitamura* (paratype of *L. dentata* var. *stolonifera*); near Mizoroiike, May 10, 1931, *S. Kitamura* (KYO). Hyogo: Kobe City, Mt. Hanaore, 100-300 m in alt., 22 May 1977, *G. Murata & Koyama H.* 32649 (KYO); Kita-ku, Yamada-cho, at the southern foot of Chigobaka-yama, 3 Jan 1978, *N. Fukuoka & N. Kurosaki* 1647 (KYO); Kita-ku, Hatta-cho, Nose, Narukawa, 300 m in alt., 26 May 1985, *N. Fukuoka* 12563 (KYO); Sanda City, Aimoto, Imakura, 180 m in alt., 29 May 1987, *N. Fukuoka & N. Kurosaki* 4503

(KYO); Sumoto City, en route from Takehara-chosuiichi to Mt. Kashiwara-yama, 100-300 m in alt., 31, May 1978, *N. Fukuoka & N. Kurosaki 1553* (KYO). **Ehime:** Uma-gun, Doi-cho, en route from Ueno to Kawamata, 25 May 1962, *M. Hotta 10651* (KYO). **Kagawa:** Kida-gun, Mure-cho, Gokenzan, 200 m in alt., 5, May 1982, *M. Takahashi 1021* (KYO). **Fukuoka:** Sawara-gun, Mt. Kanayama, ca. 600 m in alt., 20 May 1977, *T. Yahara 4290* (KYO). **Kagoshima:** Yakushima Isl., Kamiyaku-cho, along Kujukawa path, 100-200 m in alt., 9 Apr. 1984, *Yahara et al. 9056* (KYO); Yakushima Isl., Kamiyaku-cho, along Omna-gawa, 30 m in alt., 9 Apr., 1984, *Yahara et al. 9047* (KYO).

Notes: This species is exceedingly polymorphic, and thus various infraspecific taxa have been described. The color of ligules is usually yellow, but occasionally white or purplish-white. The stolons are short or absent; especially, the leaf shape, its dissection and basal part vary to a considerable degree. We regard here that var. *albiflora*, var. *stolonifera*, and f. *amplifolia*, and f. *atropurpurea* all represent some extreme forms of such variations.

2b. Subsp. *kimuranum* (Kitam.) Pak et Kawano, comb. nov.

Syn. *Ixeris dentata* subsp. *kimurana* (Kitam.) Kitam., Acta Phytotax. Geobot. 3: 133 (1934).

Ixeris kimurana Kitam., pro syn.

Ixeris dentata var. *kimurana* Ohwi, Fl. Jap. 1247 (1953); Bull. Nat. Sci. Mus. 33: 90 (1953).

Distribution. Japan.

Chromosome number: $2n=14$ (Nisioka, 1961, 1963), $2n=21$ (Nisioka, 1961, 1963; Pak and Kawano, 1990), $2n=28$ (Okabe, 1932; Takemoto, 1962, 1978; Pak and Kawano, 1990).

Selected specimens examined. JAPAN. Hokkaido: Oshima, Mt. Maesengen, 1936, *T. Ishiyama* (SAPA); Shiribeshi, Mt. Sakotan, 1915, *H. Yanagisawa* (SAPA); Iburi, Mt. Tokushunbetsu, 1953, *S. Kawano* (SAPA); Mt. Orohure, 1954, *Nakamura* (SAPA); Mt. Washibetsu, 1956, *S. Kawano* (SAPA); Ishikari, Mt. Furano, 1947, *M. Tatewaki & J. Samejima* (SAPA); Mt. Tokachi, 1947, *M. Tatewaki & J. Samejima* (SAPA); Tokachi, Mt. Saoro, 1913, *S. Nishida* (SAPA); Kushiro, Kushiro, Bonzu-yama, 1933, *H. Miyamoto* (SAPA). **Aomori:** Mt. Hakkoda, Ohdake, July 27, 1932, *A. Kimura* 3 (holotype-KYO). **Gunma:** Tone-gun, Katashina-mura, en route from Hatomachi-toge to Mt. Shibutsu, 2160 m in alt., near the summit, 2 Aug. 1977, *H. Koyama 5489* (KYO). **Nagano:** Kitaazami-gun, Hakuba-mura, en route from Mt. Shirouma-dake to Yariosen, 2000-2933 m in alt., fls. yellow, 2 Aug. 1987, *K. Deguchi & T. Takahashi 6748* (KYO). **Toyama:** Mt. Tateyama, Murodo, Aug. 13, 1931, *S. Kitamura* (paratype-KYO).

2c. Subsp. *kitayamense* (Murata) Pak et Kawano, comb. nov.

Syn. *Ixeris dentata* subsp. *kitayamensis* Murata, Acta Phytotax. Geobot. 14: 127 (1952), f. 3.

Distribution. Japan.

Chromosome number: $2n=14$, 21 (Nisioka, 1960; Takemoto, 1970; Pak and Kawano, 1990).

Specimens examined. JAPAN. Wakayama: Minamimuro-gun, Iruka-mura, Ogawaguchi, 30 May 1951, *G. Murata* 5247 (holotype-KYO); Higashimuro-gun, Kitayama-mura, Kitayamagawa, in the rock crevices along the river, 20 Apr. 1939, *Koidzumi G. s.n.* (paratype-KYO). **Nara:** Kamikawamura, inter Kashiwagi et Konodani-gawa, 28 May 1955, *G. Murata & K. Iwatsuki* 137 (KYO).

2d. Subsp. *nipponicum* (Nakai) Pak et Kawano, *comb. nov.*

Syn. *Ixeris nipponica* Nakai, Bot. Mag. (Tokyo) 34: 154 (1920).

Ixeris dentata subsp. *nipponica* (Nakai) Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 23: 122 (1956).

Distribution. Japan.

Chromosome number: $2n=14$ (Jinno, 1953; Takemoto, 1956, 1962, 1970; Pak and Kawano, 1990).

Specimens examined. JAPAN. Niigata: Kashiwazaki City, Kujirahama, Shojyodo, on the clayey slope of the grassy coast, fl. yellow, 30 May 1977, *G. Murata et al.* 31588 (KYO); Kujiranami, near Shojyodo, near the sea side, 30 May 1977, *S. Tsugaru* 3424 (KYO).

2e. Subsp. *shiranense* (Kitam.) Pak et Kawano, *comb. nov.*

Syn. *Ixeris dentata* subsp. *shiranensis* Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 23: 122 (1956).

Distribution. Japan.

Chromosome number: Unknown.

Specimens examined. JAPAN. Tochigi: Nikko, Mt. Mae-shirane, 7 Aug. 1960, *S. Kitamura s.n.* (KYO).

3. *Ixeridium gracile* (DC.) Pak et Kawano, *comb. nov.*

Syn. *Lactuca gracilis* DC., Prodr. 7: 140 (1838); J. D. Hook., Fl. Brit. India 3: 410 (1881), p. p.

Lactuca beauverdiana H. Lév., Feddes Repert. Spec. Nov. Reg. Veg. 8: 450 (1910).

Ixeris gracilis (DC.) Stebb., J. Bot. 75: 50 (1937); Lauener, Notes Roy. Bot. Gard. Edinb. 23: 391 (1976).

Distribution. Bhutan, China, Nepal (Kitamura, 1969).

Chromosome number: Unknown.

Specimens examined. BHUTAN. Eastern Himalaya, Gon Chungnang, 1600 m in alt.-Punakha, 1200 m in alt., 6 May 1967, *H. Kanai et al.* 15990 (TI). **CHINA. Kwangtung:** Jen-hwa, Man chi shan Shek Pik Ha Village, 1-10 May 1936, *W. T. Tsang* 26307 (KYO); Ts'ung-hwa: Sam Kok Shan Chan Woh Tung Village, 1-25 May 1935, *W. T. Tsang* 25116 (KYO).

4. *Ixeridium laevigatum* (Blume) Pak et Kawano, *comb. nov.*

Syn. *Prenanthes laevigata* Blume, Bijr. Fl. Ned. Ind. 2: 836 (1826).

Lactuca laevigata (Blume) DC., Prodr. 7: 140 (1818); J. Kost. Blumea 23: 169 (1976),

p.p.

Lactuca oldhamii Maxim., Mém. Biol. Bull. Phys.-Math. Imp. Sci. St.-Pétersb. 9: 363 (1874).

Ixeris laevigata (Blume) Sch.-Bip. ex Maxim. in Engl., Bot. Jahrb. Syst. 6: 69 (1884), nom. nud., ex Kitam., Acta Phytotax. Geobot. 6: 238 (1937).

Lactuca thunbergiana (Thunb.) Hayata, J. Coll. Sci. Imp. Univ. Tokyo 18: 39 (1904), quoad nom.

Lactuca dentata C. B. Robinson, Philipp. J. Sci. 3: 218 (1908), excl. syn.

Lactuca dentata var. *lanceolata* Makino, Bot. Mag. (Tokyo) 27: 30 (1913).

Lactuca stenophylla (Makino) Makino, J. Jap. Bot. 4: 10 (1927).

Ixeris oldhamii (Maxim.) Kitam., Acta Phytotax. Geobot. 3: 134 (1934).

Ixeris laevigata (Blume) Yamamoto, J. Sci. Trop. Agric. 8: 353 (1936).

Ixeris laevigata (Blume) Stebb., J. Bot. 75: 50 (1937).

Ixeris laevigata var. *lanceolata* (Makino) Kitam., Acta Phytotax. Geobot. 10: 22 (1941).

Ixeris laevigata var. *oldhamii* Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 23: 111 (1956).

Lactuca laevigata var. *exciso-dentata* J. Kost., Blumea 23: 174 (1976), f. 1f.

Distribution. Cambosia, Laos, Thailand, Vietnam, China (southern), Indonesia, Japan, New Guinea, Philippines, Taiwan (Kitamura, 1956; Kosta, 1976).

Chromosome number: $2n = 14$ (Chuang et al., 1962; Hsu, 1967, 1970; Pery and Hsu, 1978; Pak and Kawano, 1990).

Selected specimens examined. **BORNEO.** East Kalimantan: Gunung Buntung, Berau, 200-500 m in alt., 6 Jan. 1981, M. Kato & H. Wiriadinata B-5498 (KYO). **JAVA.** Central Java: en route from Bonosobo to dieng Platu, Kajajar, ca. 1000-1500 m in alt., 21 Aug. 1973, G. Murata et al. J-1105 (KYO); Baturaden at the south foot of Gunung Slamet, 17 Aug. 1973, G. Murata et al. J-555 (KYO). **PHILIPPINES.** Luzon Ilocos Norte: en route from Mt. Bubonbilit to miner's camp in Mt. Sicapoa Range, 1300-1950 m in alt., 2 Dec. 1975, K. Iwatsuki et al. P-481 (KYO); en route from miner's camp to Mt. Sicapoa range, 1700-1800 m in alt., 5 Dec. 1975, Iwatsuki et al. P-809 (KYO). **SABAH.** Kinabalu National Park: en route from Poring Hot Springs and Langanan Water Fall, 600-1000 m in alt., 4 Feb. 1969, S. Kokawa & M. Hotta 4925 (KYO). **SERAM.** C. Seram: Manusela National Park: along the trail between Selumena (750 m in alt.) and Kanikeh (620 m in alt.), Manusela valley, Kecamtan (District) Seram Utara, 20 Nov. 1983, M. Kato, et al. C-779 (KYO). **SULAWESI:** Paratian-Tamarantik, KBT. Polewali, South Sulawesi, 18 Jun. 1974, S. Yoshida 1091 (KYO). **TAIWAN.** Hualien: Luan-shan, 700-1200 m in alt., 16 Aug. 1967, C. Hsu 3517 (TAI). Taipei: Sanhsia, Mt. Yuan-shan, 300 m in alt., 23 Aug. 1964, M. Tamura & H. Koyama 23472 (KYO); Kuchi-chan to Huo-shaw-chang, 200 m in alt., 5 Aug. 1967, C. Hsu & R. Hsu 3460 (TAI); Mt. Seven Star, 5 Jul. 1967, C. Hsu 3192 (TAI); Yangming-shan to Chi-shing-shan, 17 Jun. 1967, C. Hsu 3141 (TAI); Chih-nan-kung, 11 Jun. 1967, C. Hsu 3096 (TAI). **Taoyuan:** Lalashan, 2 Feb. 1975, C.-I. Peng 1055 (TAI). **JAPAN.** Miyazaki: Kitamorogata-gun, Futamatabashi (311314-34), 28 Aug. 1984, H. Koyama 7588 (KYO); Nichinan City, Kitago-cho, Inohae, 20 Aug. 1962, K. Iwatsuki 5342 (KYO).

Notes: The leaf shape of this species is exceedingly variable, and a more thorough study is necessary to reveal the total range of variations of this taxon.

5. *Ixeridium makinoanum* (Kitam.) Pak et Kawano, *comb. nov.*

Syn. *Lactuca makinoana* Kitam., Comp. Nov. Jap. 1: 26 (1931).

Lactuca gracilis sensu J. D. Hook., Fl. Brit. India 3: 410 (1881), p. p., non DC.

Lactuca thunbergii Maxim. var. *angustifolia* Makino, Bot. Mag. (Tokyo) 19: 154 (1905).

Lactuca dentata flaviflora subvar. *angustifolia* Makino, Bot. Mag. (Tokyo) 24: 75 (1910).

Ixeris makinoana (Kitam.) Kitam., Bot. Mag. (Tokyo) 49: 284 (1935).

Ixeris gracilis sensu Kitam., in Kihara, Fauna and Flora Nepal Himalaya 261 (1955), p.p., non DC.

Distribution. Bhutan, Nepal, Vietnam, China, Japan (Kitamura, 1956).

Chromosome number: $2n=14$ (Pak and Kawano, 1990).

Selected specimens examined. **BHUTAN.** Thimbu, 23 Oct. 1958, *S. Nakao* 203 (KYO), 2200 m in alt., 22 Oct. 1958, *S. Nakao* 824 (KYO); Eastern Himalaya, Samtengang (1900 m in alt.)-Tash Choling (1900 m)-Kyebaka (1400 m)-Choojam (1300 m) 26 Apr. 1967, *G. Murata et al.* 0183 (TI); **NEPAL:** Chagma, 9 Jun. 1968, *N. Numata* 1512 (KYO); Halchok, 31 Jul. 1953, *Nakao s. n.* (KYO); Katumandu: Godavari (1600 m in alt.)-Phukhanki (2500 m in alt.), 23 Jun. 1967, *H. Hara et al. s. n.* (TI). **CHINA.** **Kwangsi:** without special locality and date, *S. K. Lau* 28800. **Kwangtung:** Sin-fung, Sai-lin-shan Village, Ngok Shing Shan, 1-16 Apr. 1938, *Y. W. Taam* 456 (KYO). **Kweichow:** without special locality and date, *S. W. Teng* 90236 (KYO). **Szechuan:** Omsi-hsien, Mt. Omsi, *W. P. Fan* 18698 (KYO); Sikang, Tien-chuan-hsion, Jul. 1939, *F. C. Tai & Class*, 4169 (KYO). **Yunnan:** pro vicar Apostolic, Nov. 1906, *E. E. Maire* 1462; Dali Xian, E side of Diancang Shan mountain range, vicinity of Yinglofeng, directly W of the city of Dali, 11 Jul. 1984, *B. Bartholomew et al.* 988 (KYO); Kunming City, Kunming Botanical Inst., 11 Sept. 1982, *H. Koyama et al.* 1413 (KYO). **JAPAN.** **Hyogo:** Akou City, Nishiune, 14 Oct. 1982, *Kurosaki & Kato* 2 (KYO); Sakaori-ike ca. 50 m in alt., 21 Sept. 1987, *J.-H. Pak* 993 (KYO). **Ehime:** Nii-gun, Funaki-mura, May 26, 1924, *T. Jinno* (holotype of *Lactuca makinoana*-KYO). **Kumamoto:** Kikuchi-gun, Nishikaushi-mura, 20 May 1907, *Koidzumi s. n.* (KYO); Yunomae, 18 Jun. 1957, *K. Mayabera s. n.* (KYO).

6. *Ixeridium parvum* (Kitam.) Pak et Kawano, *comb. nov.*

Syn. *Ixeris dentata* f. *parva* Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 23: 118 (1956).

Ixeris parva (Kitam.) Yahara, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 14: 115 (1987).

Distribution. Japan. Yakushima Island.

Chromosome number: Unknown.

Specimens examined. **JAPAN.** **Kagoshima:** Isl. Yakushima, Hananoegawa, 27 Jul. 1932, *Y. Doi s. n.*; Isl. Yakushima, Mt. Nagata, 9 Aug. 1923, *Tashiro, s. n.* (lectotype and syntype-KYO); Yakucho, near the summit of Mt. Miyanoura, 1700-1935 m in alt., 3 Aug. 1974, *G. Murata & H. Tabata* 448 (KYO); Mt. Miyanoura-dake, 17 Aug. 1933, *Tagawa s. n.* (KYO); en route from Hananoego to Minamizawa Gorge via Ishizaka-goya, 1 Sept. 1977, *K. Iwatsuki et al.* 59 (KYO).

7. *Ixeridium pusillum* (Mattf.) Pak et Kawano, *comb. nov.*

Syn. *Lactuca pusilla* Mattf., Nova Guinea 14: 523, t. 91, c. f.1-6 (1929).

Ixeris pusilla (Mattf.) Stebb., J. Bot. 75: 50 (1937).

Lactuca laevigata var. *pusilla* (Mattf.) J. Kost., Blumea 23: 172 (1976).

Distribution. New Guinea.

Chromosome number: Unknown.

Specimens examined. NEW GUINEA. **Western Highlands:** Lake Habbema, 3225 m in alt., Aug. 1938, *L. J. Brass* 9193 (L); *L. J. Brass* 9204 (L); Mt. Wilhelmina, Sept. 1938, *L. J. Brass & E. Meyer-Drees* 9732 (L); Mt. Carstensz (4400-4600 in alt.), Nov.-Dec. 1936, *F. J. Wissel* 49 (L); Kubor Range, Mt. Kinkain, 3590 m in alt., 8 Jul. 1963, *W. Vink* 16054 (L); **Southern Highlands:** Western Summit of Mt. Giluwe, 21 Aug. 1961, *R. Schodde* 1951 (L).

8. *Ixeridium pygmaeum* (Zoll. et Mor.) Pak et Kawano, **comb. nov.**

Syn. *Lactuca pygmaea* Zoll. et Mor., Nat. Geneesk. Arch. Neerl. Indie 2: 565 (1845).

Ixeris pygmaea (Zoll. et Mor.) Stebb., J. Bot. 75: 50 (1937).

Lactuca laevigata var. *pygmaea* (Zoll. et Mor.) J. Kost., in Backer & Bakh. f., Fl. Java 2: 437 (1965).

Distribution. Celebes, Ceram, Java, New Guinea (Koster, 1976).

Chromosome number: Unknown.

Specimens examined. CELEBES. Sub. div. Enrekang, Rante Mario, 17, Jun. 1937, *Eyma* 707 (L); W. Celebes, G. Bonthaim ca.2500 m in alt., 8 Jun. 1921, *W. Biinnemeyer* 11913 (L), 17 Jun. 1921, *W. Biinnemeyer* 12237 (L); G. Rantemario, Latimojung Range, Sulawesi, 3350 m in alt., 10 Feb. 1981, *J. M. B. Smith* 662 (L). MALAYSIA. **Sabah:** Mt. Kinabalu, 3860 m in alt., 5 Aug. 1978, *J. M. B. Smith* 557 (L). NEW GUINEA. **West. Star Mts.:** Mt. Antares, western (lower) summit, 3380 m in alt., 26 Jul. 1959, *C. Kalkman* 4522 (L); W. Sepik, Tel Basin, 2960 m in alt., 31 Mar. 1975, *J. F. Veldkamp* 6208 (KYO). **East. Milne Bay Dist.:** Raba Raba subdist. End of South spur of Goe Dendeniwa, Mt. Suckling, 3160 m in alt., 23 Jun. 1972, *P. F. Stevens & J. F. Veldkamp*, LAE 54224 (L); Maneau Range, Mt. Dayman, north slope, 2230 m in alt., 14 Jun. 1953, *L. J. Brass* 22906 (L). **Central Dist.:** Mt. Albert Edward, 3700 m in alt., 27 Oct. 1975, *H. Kanai* 753597 (KYO). **Eastern Highlands Dist.:** Goroka subdist., near Kerigemna camp, 6 Jul. 1956, *R. D. Hoogland & Pullen*, R. 5553 (L); Goroka subdist., Mt. Otto, 11600 ft. in alt., 26 Jan. 1970, *John R. J. & Noble I. NGF* 47078 (L). **Western Highlands Dist.:** Kubor Range, Nona-Minj-Divide, 3250 m in alt., 5 Jul. 1963, *Vink W. 16028* (L); Burgers Mt., E. Sepik, below ridge, 3675 m in alt., 23 Mar. 1977, *J. F. Veldkamp & A. Vinas* 7424 (KYO); Mt. Kegum, N ridge of Mt. Hagen, 3416 m in alt., 5 Apr. 1977, *J. F. Veldkamp & A. Vinas* 7543 (KYO). **Southern Highlands Dist.:** Mendi subdist., at the base of volcanic plug of Mt. Giluwe, 3840 m in alt., 25 Dec. 1973, *Croft et al.* LAE 60649 (L); Auriga Camp (Camp 12) 3350 m in alt., 27 Apr. 1975, *J. F. Veldkamp* 6577 (L).

9. *Ixeridium sagittarioides* (C. B. Clarke) Pak et Kawano, **comb. nov.**

Syn. *Lactuca sagittarioides* C. B. Clarke, Comp. Ind. 265 (1876).

Ixeris sagittarioides (C. B. Clarke) Stebb., J. Bot. 75: 51 (1937).

Distribution. Thailand and Himalayan regions (Clarke, 1876; Stebbins, 1937).

Chromosome number: Unknown.

Specimens examined: **THAILAND.** Chiang Mai, along Mae Klang Phat River (RS-12), alt. 940-1010m in alt., Doi Inthanon. In pine forests. Aug. 5, 1988, *H. Koyama T-61094* (KYO) **NEPAL.** Mitare-Kirenterhap, April 24, 1963, *M. Numata* (KYO).

10. *Ixeridium siamense* (Kerr) Pak et Kawano, **comb. nov.**

Syn. *Lactuca siamensis* Kerr, Kew Bull. 333 (1935).

Ixeris siamensis (Kerr) Stebb., J. Bot. 75: 51 (1937).

Distribution. Thailand.

Chromosome number: Unknown.

Specimens examined. **THAILAND.** Loi, Kao Krading, ca. 1200 m in alt., in open grassy ground, *Kerr 8714* (holotype - K); N. Prov. Chiang Mai: Mae Sa Nam. Hod Dist. 1100 m in alt., 12 Jan 1983, *H. Koyama et al. T-32378* (KYO); along route 1099, Omkoi Dist. 1050-1150 m in alt., 10 Jan. 1983, *H. Koyama et al. T-32257* (KYO); Om Koi, 900 m in alt., 20 Jan. 1964, *B. Hansen et al. 10823* (BM); East of Fang Bog, ca. 350 m in alt., 28 Feb. 1958, *Th. Sorensen et al. 1792* (BM); 5 km east of Boluang, 1020 m in alt., 26 Feb. 1959, *Th. Sorensen et al. 7050* (BM); Poo Kradung, 1300 m in alt., 19 Mar. 1958, *Th. Sorensen et al. 2290* (BM).

Notes. This species possesses very small outer involucre bracts, just like other species referred to this group. But, it has white pappus, and it is not certain as to the true identity whether or not it belongs to *Ixeridium* (*sensu* Pak and Kawano). At present, chromosomal data are not available.

11. *Ixeridium subacaule* (J. Kost.) Pak et Kawano, **comb. nov.**

Syn. *Lactuca subacaulis* J. Kost., Blumea 23: 176 (1976), f. 1 a-e.

Distribution. New Guinea.

Chromosome number: Unknown.

Selected specimens examined. **NEW GUINEA. Eastern Highlands Dist.:** Mt. Wilhelm, Pindaunde Valley, Saddle camp, 14000 ft. in alt., 16 Aug. 1971, *J. M. B. Smith ANU 15129* (holotype-L); Mt. Wilhelem, east slope, 14250 ft. in alt., May 1965, *Walker, ANU 5246* (L); in the summit area near trig point on track to the summit, in rocky gravelly soil, 4300 m in alt., 25 May 1965, *M. M. J. Balggoy v. 452* (L); on peak, Chimbu subdist., 14700 ft. in alt., 26 Jul. 1956, *R. D. Hoogland & R. Pullen 5786* (L); 1/2 mile past Wilhelem trig point, 14200 ft. in alt., 28 May 1966, *D. N. Mcean & L. K. Wade ANU 7233* (L); *ibid.*, 4100 m in alt., 13 Jun. 1960, *E. Borgmann 97* (L).

12. *Ixeridium transnokoense* (Sasaki) Pak et Kawano, **comb. nov.**

Syn. *Lactuca transnokoensis* Sasaki, Trans. Nat. Hist. Soc. Taiwan 21: 223 (1931).

Ixeris transnokoensis (Sasaki) Kitam., Bot. Mag. (Tokyo) 49: 284 (1935).

Distribution. Taiwan.

Chromosome number: Unknown.

Selected specimens examined. TAIWAN. Karenko, inter M. Kiraishu et Noko, 3300 m in alt., 24 Aug. 1929, *Sasaki s.n.* (syntype - KYO); Nan-tou: Mt. Neng-kao, between Yun-hai (Onoe) and Tien-chih (Noko) 2800 m in alt., 11 Aug. 1964, *M. Tamura & H. Koyama 23245* (KYO); between Tien-chih (Noko) and Neng-kao, 2850 m in alt., 12 Aug. 1964, *M. Tamura & H. Koyama 23348* (KYO); en route from Tungpu to Patungkuan, 2600 m in alt., 15 Aug. 1963, *M. Tamura et al. 22040* (KYO); Nokoan 7 Aug. 1919, *Matuda E. 18* (TI); Ten-tzu to Nen-kao, 12 Aug. 1971, *T. C. Huang et al. 5783* (TNS).

13. *Ixeridium yakuinsulare* (Yahara) Pak et Kawano, **comb. nov.**

Syn. *Ixeris yakuinsularis* Yahara, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 14: 115 (1987).

Distribution. Japan. Yakushima Island.

Chromosome number: Unknown.

Specimens examined. JAPAN. KYUSHU: **Kagoshima:** Isl. Yakushima, interior of Nagata, 22 Aug. 1957, *Iwatsuki K. 3290* (KYO).

Crepidiastrum Nakai, Bot. Mag. (Tokyo) 34: 147 (1920); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 105 (1955).

Syn. *Crepis* sect. *Suffruticosae* Maxim., Mém. Biol. Bull. Phys.-Math. Acad. Imp. Sci. St.-Petersb. 9: 348 (1874).

Paraixeris Nakai, Bot. Mag. (Tokyo) 34: 155 (1920); Tzvel., Fl. URSS 29: 396 (1964).

Ixeris subgen. *Crepidiastrum* (Nakai) Stebb., J. Bot. 75: 45 (1937).

Ixeris subgen. *Paraixeris* (Nakai) Stebb., J. Bot. 75: 46 (1937).

Youngia sect. *Paraixeris* (Nakai) Kitam., Acta Phytotax. Geobot. 11: 126 (1942); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 120 (1955).

Type: *Crepidiastrum lanceolatum* (Houtt.) Nakai

Annual, biennial, or perennial; subshrubs or herbs with stout simple or many branched stems; roots tap-rooted; leaves mainly rosulate or cauline. Inflorescences lateral, or lateral and terminal, corymbose; many heads with 5-19 florets; involucre cylindrical, narrow; bracts 2-seriate, glabrous, herbaceous, with scarious margins; inner bracts linear, equal, 5-8 in number, much larger and longer than the outer bracts; outer bracts short, imbricate; receptacles flat, naked; flowers bisexual, ligulate, 5-toothed, yellow, white. Achenes fusiform, somewhat flattened, unequally obtuse 10-20-winged; costae composed of libriform fiber and sclereid-fiber cells; beakless or short and stout beak; pappus bristles many, slender, scaberrulous, white, deciduous. Basic chromosome number: $x=5$ (see Pak and Kawano, 1990c).

Key to the sections

- 1a. Herbs; inflorescences lateral and terminal; achenes with short and stout beak. sect. *Paraixeris*
- 1b. Subshrubs; inflorescences lateral; achenes lacking beak.
- 2a. Inner involucral bracts 8, florets 8-12. sect. *Crepidiastrum*
- 2b. Inner involucral bracts 5, florets 5. sect. *Monostemma*

Sect. *Crepidiastrum*.

Syn. *Crepis* sect. *Suffruticosae* Maxim., Melanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. St.-Petersb. 9: 348 (1874), p.p.

Crepidiastrum sect. *Eucrepidiastrum* Nakai, Bot. Mag. (Tokyo) 34: 148 (1920).

Crepidiastrum sect. *Monostemma* Nakai, Bot. Mag. (Tokyo) 34: 148 (1920), p.p.

Crepidiastrum sect. *Suffruticosae* (Maxim.) Kitam., Acta Phytotax. Geobot. 6: 235 (1937).

Type: *Crepidiastrum lanceolatum* (Houtt.) Nakai.

Herbs glabrous, suffrutescent, with branched stems; leaves rosulate; flowering branches lateral; inner involucre bracts 8; heads with 8-12 ligules; achenes slightly flattened, with 10-20 costae.

Key to the species

- 1a. Leaves not spatulate, 2-7 cm wide. *C. lanceolatum*
- 1b. Leaves spatulate, 1-5 cm wide, round at apex.
- 2a. Pappus 5mm long, ligules 11-13 mm long. *C. keiskeanum*
- 2b. Pappus 3mm long, ligules 8-11 mm long. *C. taiwanianum*

1. *Crepidiastrum keiskeanum* (Maxim.) Nakai, Bot. Mag. (Tokyo) 34: 149 (1920); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 110 (1955).

Syn. *Crepis keiskeana* Maxim., Mém. Biol. Bull. Phys.-Math. Acad. Imp. Sci. St.-Petersb. 9: 351 (1874).

Hieraciodes keiskeanum O. Kuntze., Rev. Gen. Pl. 1: 346 (1891).

Lactuca keiskeana Makino, Bot. Mag. (Tokyo) 27: 256 (1913).

Crepidiastrum keiskeanum f. *pinnatilobum* Hisauchi, J. Jap. Bot. 10: 662 (1934), f. 2.

Distribution. Japan.

Chromosome number: $2n=10$ (Miyaji, 1913; Ishikawa, 1916, 1921; Nishioka, 1956; Sakai, 1962; Pak and Kawano, 1990).

Selected specimens examined. **JAPAN.** **Shizuoka:** Kamo-gun, Minamiizu-cho, en route from Nakagi to Iruma, by the road side near the seacoast, 0-200m. in alt., 23 Nov. 1986, *M. Shimizu 5988* (KYO); Idzu Peninsula, Kamo-gun, Higashiizu-cho, Inatori, (391345-13), on the rocky cliff near the beach, 25 Nov. 1972, *F. Maeda s.n.* (KYO). **Aichi:** Atsumi-gun, Iramisaki, Hide, 29 Dec. 1962, *G. Murata 17699* (KYO). **Hyogo:** Isl. Awaji, Mihara-gun, Nandan-cho, Fukura, Kokuminkyukamura. On exposed cliffs along the seacoast, 27 Jul. 1983, *N. Fukuoka 12167* (KYO). **Wakayama:** Hidaka-gun, Hidaka-cho, en route from Amerika-mura to Hinomisaki, 1 Dec. 1968, *A. Nitta 12852* (KYO); Nishimuro-gun, Kushimoto-cho, Wabuka, in crevices on rocks near the beach, 3 m in alt., 18 Oct. 1981, *H. Koyama 5669* (KYO). **Kochi:** Aki City, between Ohya-saki and Ioki, *S. Kitamura & G. Murata 2620* (KYO); Hata-gun, Ohtsuki-cho, near Ohdo-kaigan, near the sea coast, 100-200 m in alt., 30 Nov. 1979, *K. Mimoro et al. 5336* (KYO). **Ohita:** Yakata-jima, Minamiamabe-gun, Kamae-cho, on rocks near the beach, 27 Nov. 1968, *M. Togashi 6868* (KYO).

Notes: This species is variable in leaf shape. Plants with pinnate-lobed leaves are often

found, and classified as f. *pinnatilobum*.

2. *Crepidiastrum lanceolatum* (Houtt.) Nakai, Bot. Mag. (Tokyo) 34: 150 (1920); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 106 (1955).

Syn. *Prenanthes lanceolata* Houtt., Nat. Hist. 28: 383 (1779), t.66, f.2.

Prenanthes integra Thunb., Fl. Jap. 300 (1784).

Chondrilla lanceolata (Houtt.) Poir., Encyl. Suppl. 2: 329 (1811).

Youngia lanceolata (Houtt.) DC., Prodr., 7: 193 (1838).

Youngia integra (Thunb.) A. Gray, Mem. Amer. Acad. Arts 6: 396 (1859).

Crepis integra (Thunb.) Miq., Ann. Mus. Ludg. -Bat. 2: 190 (1866).

Crepis tanegana Miq., Ann. Mus. Ludg. -Bat. 2: 198 (1866).

Crepis integra var. *pinnatiloba* Maxim., Mém. Biol. Bull. Phys.-Math. Acad. Imp. Sci. St.-Pétersb. 9: 350 (1874).

Hieraciodes integrum (Thunb.) O. Kuntze, Rev. Gen. Pl. 345 (1891).

Crepis lanceolata var. *β. pinnatiloba* (Maxim.) Makino, Bot. Mag. (Tokyo) 27: 88 (1903).

Lactuca quercus H. Lév. et Vaniot, in H. Lév., Feddes Repert. Spec. Nov. Reg. Veg. 8: 141 (1910).

Lactuca lanceolata (Houtt.) Makino, Bot. Mag. (Tokyo) 27: 257 (1913).

Lactuca lanceolata a. *typica* Makino, Bot. Mag. (Tokyo) 27: 257 (1913).

Crepis koshunense Hayata, Icon. Pl. Formos. 8: 79 (1919), f.32.

Crepidiastrum koshunense (Hayata) Nakai, Bot. Mag. (Tokyo) 34: 149 (1920).

Crepidiastrum lanceolatum f. *pinnatilobum* (Maxim.) Nakai, Bot. Mag. (Tokyo) 34: 151 (1920).

Crepidiastrum quercus (H. Lév. et Vaniot) Nakai, Bot. Mag. (Tokyo) 34: 152 (1920).

Crepidiastrum lanceolatum a. *typicum* Nakai, Bot. Mag. (Tokyo) 34: 159 (1920).

Lactuca lanceolatum var. *batakanense* Kitam., Acta Phytotax. Geobot. 2: 45 (1933).

Crepidiastrum lanceolatum var. *batakanense* (Kitam.) Nemoto, Fl. Jap. Suppl. 770 (1936).

Ixeris koshunensis (Hayata) Stebb., J. Bot. 75: 45 (1937).

Ixeris lanceolata (Houtt.) Stebb., J. Bot. 75: 46 (1937).

Ixeris quercus (H. Lév. et Vaniot) Stebb., J. Bot. 75: 46 (1937).

Crepidiastrum lanceolatum f. *batakanense* (Kitam.) Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 108 (1955).

Distribution. China, Korea, Japan (Kitamura, 1955).

Chromosome number: 2n=10 (Ishikawa, 1916, 1921; Chuang et al., 1962; Peng and Hsu, 1978; Pak and Kawano, 1990).

Specimens examined. JAPAN. Kochi: Okino-shima, Sukuno City, between Moshima and Hirose, 24 Nov. 1966, S. Kitamura & G. Murata 2605 (KYO). **Nagasaki:** Isl. Fukue-jima, Minamimatsuura-gun, Miiraku-cho, Takahama-kaigan, in rocky places near the sea, 8 Oct. 1982, N. Fukuoka 11778 (KYO); Isl. Iki, Iki-gun, Gonoura-cho, Ariyasu-hure, 29 Nov. 1986, S. Tsugaru 7696 (KYO). **Kagoshima:** Kimotsuki-gun, Sata-cho, Satamisaki, in dense evergreen forests near the sea side, 24 Jan. 1965, G. Murata et al. 171 (KYO); Isl. Tokunoshima, Tokunoshima-cho, between Nanbaru and Chinen, on sunny places along the road near the sea coast, fls. yellow, 13 Mar. 1986, G. Murata

56301 (KYO); Yakushima Isl., Kurio, near the seacoast, *J. Murata et al.* 15739 (KYO). **Okinawa:** Ryukyu Isl., Amami-ohshima, Ohshima-gun, Uken-mura, en route from Yuwan to Mt. Yuwan-dake, in sunny places by the road, 7 Apr. 1970, *N. Fukuoka* 7963 (KYO); Itoman City, en route from Arasaki to Gushikawa-jyo City, in rocky seashore or sunny roadside, 26 Nov. 1983, *S. Terabayashi & E. Miki* 2165 (KYO).

Notes: This species is variable in leaf shape. Plants with pectinate-pinnatifid leaves are often found, and classified as *f. pinnatilobum* or *f. batakanense*.

3. *Crepidiastrum taiwanianum* Nakai, Bot. Mag. (Tokyo) 34: 152 (1920); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 111 (1955).

Syn. *Crepis integra sensu* Hayata, Icon. Pl. Formos. 8: 79 (1919), p.p., non Miq.

Lactuca taiwaniana (Nakai) Makino et Nemoto, Fl. Jap. ed 2:1246 (1931).

Crepidiastrum koshunense var. *taiwanianum* (Nakai) Yamamoto, J. Soc. Trop. Agric. 8: 356 (1936).

Ixeris taiwaniana (Nakai) Stebb., J. Bot. 75: 46 (1937).

Distribution. Taiwan.

Chromosome number: $2n=10$ (Peng and Hsu, 1978).

Specimens examined. TAIWAN. Without special locality, 30 Mar. 1932, *M. Tatewaki s.n.* (KYO).

Sect. *Monostemma* Nakai, Bot. Mag. (Tokyo) 34: 148 (1920).

Syn. *Crepis* sect. *Suffruticosae* Maxim., Mém. Biol. Bull. Phys.-Math. Acad. Imp. Sci. St.-Petersb. 9: 348 (1874), p.p.

Cacalia sect. *Dendrocacalia* Nakai, Bot. Mag. (Tokyo) 26: 12 (1915), p.p.

Crepidiastrum Sect. *Monostemma* Nakai, Bot. Mag. (Tokyo) 34: 148 (1920), p.p.

Crepidiastrum sect. *Monostemma* Nakai, Bot. Mag. (Tokyo) 34: 148 (1920), p.p.

Crepidiastrum sect. *Eucrepidiastrum* Nakai, Bot. Mag. (Tokyo) 34: 148 (1920), p.p.

Crepidiastrum sect. *Macrocrepidiastrum* Nakai et Tuyama, Bot. Mag. (Tokyo) 50: 374 (1936).

Crepidiastrum sect. *Suffruticosae* (Maxim.) Kitam., Acta Phytotax. Geobot. 6: 235 (1937), p.p.

Type: *Crepidiastrum grandicollum* (Koidz.) Nakai.

Subshrubs; axially brown-villous; inner involucre 5; heads with 5 ligules; achenes flattened, with 10-14 costae.

Key to the species

1a. Flowers white; stems 1-2 m high.

2a. Leaves petioled, acute or obtuse; achenes 3-3.5 mm long;

costae 114-155 μ m thick. *C. ameristophyllum*

2b. Leaves sessile, rounded; achenes 2.8 mm long; costae 84-88 μ m thick. *C. linguaefolium*

1b. Flowers yellow; stems abbreviate.

3a. Achenes 4.4-5.4 mm wide. *C. grandicollum*

3b. Achenes 5.8-8.3 mm wide. *C. platyphyllum*

4. *Crepidiastrum ameristophyllum* (Nakai) Nakai, Bot. Mag. (Tokyo) 34: 148 (1920); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 113 (1955).
 Syn. *Cacalia ameristophylla* Nakai, Bot. Mag. (Tokyo) 29: 13 (1920).
Lactuca ameristophylla (Nakai) Makino et Nemoto, Fl. Jap. ed. 2: 1241 (1931).
Ixeris ameristophylla (Nakai) Stebb., J. Bot. 75: 45 (1937).

Distribution. Japan, Bonin Islands.

Chromosome number: $2n=10$ (Ono, 1975a, 1975b; Ono and Masuda, 1981; Pak and Kawano, 1990).

Specimens examined. JAPAN. Tokyo: Bonin Isls. (Ogasawara Isls.), Chichijima, Hukuzawa-mura, 17 Jan. 1919, *Nishimura s.n.* (KYO); Hahajima, en route from Okimura to Mt. Chibusa via Chibusayama new path, 200-400 m in alt., 14 Jan. 1980, *Y. Shimizu 8012* (KYO).

5. *Crepidiastrum grandicollum* (Koidz.) Nakai, Bot. Mag. (Tokyo) 34: 149 (1920); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 112 (1955).
 Syn. *Lactuca grandicolla* Koidz., Bot. Mag. (Tokyo) 33: 217 (1919).

Distribution. Japan, Bonin Islands.

Chromosome number: $2n=10$ (Ono, 1975b; Ono and Masuda, 1981; Pak and Kawano, 1990).

Specimens examined. JAPAN. Tokyo: Bonin Isls. (Ogasawara Isls.), Chichijima, in the vicinity of Mt. Kasayama, on the old lava, fl. yellow, 290 m in alt., 3 Dec. 1977, *Y. Shimizu 77-139* (KYO).

6. *Crepidiastrum linguaefolium* (A. Gray) Nakai, Bot. Mag. (Tokyo) 34: 152 (1920); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 114 (1955).
 Syn. *Ixeris linguaefolia* A. Gray, Mem. Amer. Acad. Arts 6: 398 (1859).
Crepis linguaefolia (A. Gray) Maxim., Mém. Biol. Bull. Phys.-Math. Acad. Imp. Sci. St.-Petersb. 9: 351 (1874).
Lactuca linguaefolia (A. Gray) Makino, Bot. Mag. (Tokyo) 27: 256 (1913).

Distribution. Japan, Bonin Islands.

Chromosome number: $2n=10$ (Babcock et al., 1937; Ono, 1977; Ono and Masuda, 1981; Pak and Kawano, 1990).

Specimens examined. JAPAN. Tokyo: Bonin Isls. (Ogasawara Isls.), Hahajima, R. Otani, 18 Nov. 1970, *M. Ono & S. Kobayashi s.n.* (KYO); Hahajima, en route from Oki-mura to Mt. Chibusa via Chibusayama new path, 200-400 m in alt., 14 Jan. 1980, *Y. Shimizu 80-21* (KYO); Hahajima, Hyogidaira-Miyukihama, on slightly shady banks, 5 Jun. 1971, *K. Sohma et al. 715378* (KYO).

7. *Crepidiastrum platyphyllum* (Franch. et Savat.) Kitam., Acta Phytotax. Geobot. 6: 235 (1937); Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 109 (1955).
 Syn. *Crepis integra* β . *platyphyllum* Franch. et Savat., Enum. Pl. Jap. 1: 272 (1875).
Crepis lanceolata var. γ . *platyphylla* (Franch. et Savat.) Makino, Bot. Mag. (Tokyo) 17: 88 (1903).

Lactuca lanceolata var. *γ. platyphylla* (Franch. et Savat.) Makino, Bot. Mag. (Tokyo) 27: 88 (1913).

Crepidiastrum lanceolatum var. *latifolium* (Makino) Nakai, Bot. Mag. (Tokyo) 34: 151 (1920).

Crepidiastrum lanceolatum var. *latifolium* f. *subpetiolatum* Nakai, Bot. Mag. (Tokyo) 34: 151 (1920).

Lactuca platyphylla (Franch. et Savat.) Makino, J. Jap. Bot. 2: 10 (1926).

Crepidiastrum lanceolatum var. *platyphyllum* (Franch. et Savat.) Tuyama, Bot. Mag. (Tokyo) 50: 377 (1936).

Ixeris lanceolata subsp. *platyphylla* (Makino) Stebb., J. Bot. 75: 46 (1937).

Crepidiastrum platyphyllum f. *subpetiolatum* (Nakai) Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 110 (1955).

Distribution. Japan.

Chromosome number: $2n=10$ (Tahara and Ishikawa, 1911; Takamine, 1916; Ishikawa, 1921; Babcock et al., 1937; Nisioka, 1956; Pak and Kawano, 1990).

Specimens examined. JAPAN. Chiba: Izumi-gun, Ohara-cho, near the port of Kazusa-oohara, 16 Oct. 1980, *Deguchi 5378* (KYO); along the shore of Tateyama City, 27 Oct. 1966, *M. Hiroe 17217* (KYO). Isl. Aoga-shima, Isls. Izu, Aogashima-mura, en route from Yasundo-go to Sampo port, on sunny mountain slope, roadside, 2 Nov. 1977, *M. Kato & E. Miki 155* (KYO). **Shizuoka:** Misaki-cho, Hamamoroiso, on rocks of the seacoast, 22 Nov. 1959, *G. Murata 13374* (KYO).

Notes: This species is variable in leaf shape. Plants with long petioled leaves are often found, and classified as f. *subpetiolatum*.

Sect. *Paraixeris* Pak et Kawano, **comb. nov.**

Syn. *Paraixeris* Nakai, Bot. Mag. (Tokyo) 34: 155 (1920); Tzvel., Fl. URSS 29: 396 (1964).

Ixeris subgen. *Paraixeris* Stebb., J. Bot. 75: 46 (1937).

Youngia sect. *Paraixeris* Kitam., Acta Phytotax. Geobot. 11: 126 (1942); Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 120 (1955).

Type: *Crepidiastrum denticulatum* (Houtt.) Nakai

Herbs; stems prominently branched; inflorescences lateral and terminal; achenes fusiform, slightly flattened, 10-18 winged; short-beaked.

Key to the species

1a. Inner involucre bracts 7-8; florets 13-19.

2a. Leaves auriculate clasping; florets 13-15. *C. denticulatum*

2b. Leaves amplexicaule clasping; florets 17-19. *C. sonchifolium*

1a. Inner involucre bracts 5; florets 5 or 6.

3a. Leaves oblong lanceolate, with narrowed petiolelike base. *C. yoshinoi*

3b. Leaves pinnately divided, petioled.

4a. Part bearing leaflets winged; incised leaf segment sessile; inner bracts thickened-keeled at the base after anthesis. *C. koidzumianum*

4a. Part bearing leaflets not winged; incised segment leaf with short petiole; inner bracts not

thickened-keeled at the base after anthesis.

5b. Achenes ribbed, beaked. *C. chelidoniifolium*

5a. Achenes smooth, lacking beak. *C. saxatile*

8. *Crepidiastrum chelidoniifolium* (Makino) Pak et Kawano, **comb. nov.**

Syn. *Lactuca chelidoniifolia* Makino, Bot. Mag. (Tokyo) 12: 47 (1898).

Lactuca senecio H. Lév. et Vaniot, in H. Lév., Fedde, Repert. Spec. Nov. Reg. Veg. 8: 140 (1910).

Paraixeris chelidoniifolia (Makino) Nakai, Bot. Mag. (Tokyo) 34: 156 (1920).

Youngia chelidoniifolia (Makino) Kitam., Acta Phytotax. Geobot. 11: 128 (1942).

Distribution. China, Korea, Japan (Kitamura, 1955).

Chromosome number: $2n=10$ (Ishikawa, 1921; Pak and Kawano, 1990).

Specimens examined. KOREA. Kyong-sangnam-do: Mt. Chii, Dukdu-san, 12 Nov. 1935, S. Okamoto 16214 (KYO). JAPAN. Ehime: Kamiukena-gun, Omogo-mura, Mts. Ishizuchi, en route from Tsuchigoya to top of Mt. Tsutsujo in Mts. Ishizuchi, in light forests, ca. 1600 m in alt., 27 Sept. 1972, N. Fujita 509 (KYO).

9. *Crepidiastrum denticulatum* (Houtt.) Pak et Kawano, **comb. nov.**

Syn. *Prenanthes denticulata* Houtt., Nat. Hist. 27: 385 (1779), t. 66, f. 4.

Prenanthes hastata Thunb., Fl. Jap. 301 (1784).

Youngia hastata (Thunb.) DC., Prodr. 7: 194 (1838).

Youngia dentata DC., Prodr. 7: 193 (1838), excl. syn.

Youngia chrysantha Maxim., Prim. Fl. Amur. 181 (1859).

Ixeris ramosissima sensu A. Gray, Mem. Amer. Acad. Arts 6: 397 (1859), non Benth.

Lactuca denticulata (Houtt.) Maxim., Bull. Acad. St.- Pétersb. 19: 529 (1874).

Lactuca denticulata f. *pinnatipartita* Makino, Bot. Mag. (Tokyo) 13: 48 (1898).

Ixeris denticulata (Houtt.) Nakai, Bot. Mag. (Tokyo) 34: 155 (1920), nom. nud.; Stebb., J. Bot. 75: 46 (1937).

Paraixeris denticulata (Houtt.) Nakai, Bot. Mag. (Tokyo) 34: 156 (1920).

Paraixeris denticulata f. *pinnatipartita* (Makino) Nakai, Bot. Mag. (Tokyo) 34: 157 (1920).

Ixeris denticulata f. *pinnatipartita* (Makino) Stebb., J. Bot. 75: 47 (1937).

Youngia denticulata (Houtt.) Kitam., Acta Phytotax. Geobot. 11: 128 (1942).

Paraixeris denticulata f. *pallescens* Momiyama et Tuyama, J. Jap. Bot. 21: 235 (1948).

Youngia denticulata f. *pinnatipartita* (Makino) Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 125 (1955).

Youngia denticulata f. *pallescens* (Momiyama et Tuyama) Kitam., Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Biol. 22: 126 (1955).

Paraixeris pinnatipartita (Makino) Tzvel., Fl. URSS 29: 398 (1964).

Distribution. China, Korea, Japan (Kitamura, 1955).

Chromosome number: $2n=10$ (Ishikawa, 1916, 1921; Babcock et al., 1937; Heitz, 1929, 1931, 1932, Nisioka, 1956; Fujishima, 1980; Pak and Kawano, 1990).

Specimens examined. **CHINA.** Xiangshan, Beijing, under woods, fls. yellow, 105 m in alt., 12 Sept. 1986, *B. M. Wang* 097 (KYO). **JAPAN.** **Akita:** Kadzuno-gun, Hachimantai-cho, Mizusawa-jinja, (404401/12), at the edge of *Cryptomeria*-plantation along route 341, 400 m in alt., 28 Aug. 1987, *H. Koyama* 7893 (KYO). **Fukushima:** Shinch-machi, Abukuma mts., Fukuda pass, ca. 130-200 m in alt., 3 Oct. 1986, *J. Iketsu et al.* 1040 (KYO). **Gifu:** Ibi-gun, Kasuga-mura, Nohara-dani, ca. 100-400 m in alt., 13 Oct. 1985, *H. Takano* 1098 (KYO); Kuze-mura, Hisaka, along the ravine, south of Kamimura, ca. 400-700 m in alt., 21 Oct. 1984, *H. Takahashi et al.* 929 (KYO); Mugi-gun, Horado-mura, en route from Kouga-jinja to the top of Mt. Kouga-san, 21 Oct. 1979, *H. Takahashi* 4161 (KYO); Yoshiki-gun, Kamitakara-mura, Kamata-onsen, 800 m in alt., 3 Oct. 1968, *G. Murata et al.* 460 (KYO). **Kyoto:** Kasu-gun, Ohe-cho, Naigu, Shiroyama, 100-250 m in alt., on the sunny place at the edge of forests, 18 Oct. 1983, *G. Murata* 55729 (KYO). **Shiga:** Sakata-gun, Taga-machi, Gongendani, limestone crevices, 3 Nov. 1955, *T. Shimizu* 1607 (KYO). **Nara:** Yoshino-gun, Kamikitayama-mura, Wasamata-dani, NE slope of Mt. Wasamata, in deciduous forests on limestone, 800 m in alt., fls. yellow, 22 Sept. 1986, *Tsugaru et al.* 7544 (KYO). **Hyogo:** Awaji-shima Isl., Tsuna-gun, Hokutan-cho, en route from Nojima-Shonyudo to Todoroki, by path in secondary forests, 10-260 m in alt., 6 Nov. 1983, *N. Kurosaki* 13876 (KYO); Kinosaki-gun, Hidaka-cho, at the higher elevation of Mt. Ohoka-yama, 450-660 m in alt., 10 Oct. 1984, *N. Fukuoka* 12435 (KYO). **Kagawa:** Kagawa-gun, Shionoe-cho, Mt. Ohtaki, 800 m in alt., 19 Oct. 1984, *M. Takahashi* 1927 (KYO). **Okayama:** Takahashi City, Imazu, Kinoyama, 80-320 m in alt., fls. yellow, 15 Oct. 1988, *S. Fujii* 2597 (KYO). **Kagoshima:** Yakushima Isl., Kumage-gun, Kamiyaku-cho, Shirakawa, Issoh, in dense subtropical evergreen forests along Issoh River, ca. 150-250 m in alt., 7 Nov. 1983, *G. Murata et al.* 640 (KYO).

Notes: This species is variable in leaf shape. Plants with pinnately lobed or pale yellow leaves are often found, and classified as *f. pinnatifartita* or *f. pallescens*.

10. *Crepidiastrum koidzumianum* (Kitam.) Pak et Kawano, **comb. nov.**

Syn. *Youngia koidzumiana* Kitam., Acta Phytotax.Geobot. 11: 127 (1942).

Youngia x *koidzumiana* Kitam., in Lee, T.-B., Fl. Kor. 791 (1982).

Distribution. Korea.

Chromosome number: $2n=10$ (Pak, 1991)

Specimens examined. **KOREA.** Kyongsangnam-do: Sanchong-gun, Mt. Chiri-san, 1 Nov. 1933, *Koidzumi G. s. n.* (holotype-KYO).

11. *Crepidiastrum saxatile* (A. Baran.) Pak et Kawano, **comb. nov.**

Syn. *Lactuca saxatilis* A. Baran., Act. Soc. Harb. Invest. Nat. Ethn. 12: 34 (1954), f. 27-30; Feddes Rept 63: 289 (1961).

Paraixeris saxatilis (A. Baran.) Tzvel., Fl.URSS 29: 400 (1964).

Distribution. China, Manchuria (Tzvelev, 1964).

Chromosome number: Unknown.

Notes: According to Baranov (1961, 1962), *Crepidiastrum saxatiliunum* ("=*Lactuca saxatilis*") is clearly distinguishable from *Crepidiastrum chelidoniifolium* ("=*Lactuca chelidoniifolia*") by having broader ovate outer involucral bracts, smooth, pot-shaped

achenes lacking beaks, while *C. chelidoniifolium* is characterized by having oblong outer involucre bracts and ribbed, beaked, fusiform achenes. Although we did not have a chance to examine the authentic specimens of this extremely rare plant, judging from the original description and illustrations provided by Baranov (l.c.), it seems no doubt to represent a taxon referable to *Crepidiastrum* sect. *Paraixeris sensu* Pak et Kawano.

12. *Crepidiastrum sonchifolium* (Bunge) Pak et Kawano, **comb. nov.**

Syn. *Prenanthes sonchifolia* Bunge, Enum. Pl. Chin. Bor. 40 (1830).

Youngia sonchifolia (Bunge) Maxim., Prim. Fl. Amur. 180 (1859).

Youngia serotina Maxim., Prim. Fl. Amur. 180 (1859).

Ixeris sonchifolia (Bunge) Hance, J. Linn. Soc. 13: 108 (1873).

Lactuca denticulata var. *sonchifolia* Maxim., Mém. Biol. Bull. Phys.-Math. Acad. Imp. Sci. St.-Petersb. 9: 360 (1874).

Lactuca sonchifolia (Bunge) Benth. et Hook. ex Debeaux, Act. Soc. Linn. Bordeaux 31: 229 (1876).

Lactuca bungeana Nakai, Fl. Kor. 2: 56 (1911).

Ixeris serotina (Maxim.) Kitag. Index Fl. Gehol. 95 (1936).

Ixeris denticulata subsp. *sonchifolia* (Bunge) Stebb., J. Bot. 75: 48 (1937).

Ixeris sonchifolia var. *serotina* (Maxim.) Kitag. Lineam. Fl. Mansh. 455 (1939).

Paraixeris sonchifolia (Bunge) Tzvel., Fl. URSS 29: 399 (1964).

Paraixeris serotina (Maxim.) Tzvel., Fl. URSS 29: 399 (1964).

Paraixeris sonchifolia var. *serotina* (Maxim.) Kitag. Neo-Lineam. Fl. Mansh. 664 (1979).

Distribution. China, Korea (Kitamura, 1955).

Chromosome number: $2n=10$ (Babcock et al., 1937; Volkova and Boyko, 1986; Pak and Kawano, 1990).

Specimens examined. CHINA. Peking, *K. S. Chow 75056* (1975) (KYO). Liaoning Sheng, Lueda City: Dalian City, in the campus of Dalian Institute, 25 Jul. 1985, *H. Koyama 7670* (KYO). Guizhou: Yinjiang Xian, along the trail between Zhangjiaba and Huguoshi on the W side on the Fanjing Shan mountain range, growing on rock outcrop and cliff face along the road, leaves purplish, florets yellow, sap milky, ca. 920 m in alt., 25 Sept. 1986, *B. Bartholomew et al. 1673* (KYO).

13. *Crepidiastrum yoshinoi* (Makino) Pak et Kawano, **comb. nov.**

Syn. *Lactuca denticulata* var. *yoshinoi* Makino, Bot. Mag. (Tokyo) 24: 302 (1910).

Lactuca yoshinoi (Makino) Makino et Nakai, Bot. Mag. (Tokyo) 26: 327 (1912).

Paraixeris yoshinoi (Makino) Nakai, Bot. Mag. (Tokyo) 34: 158 (1920).

Youngia yoshinoi (Makino) Kitam., Acta Phytotax. Geobot. 11: 127 (1942), pl.3, f. 3.

Distribution. Japan (Okayama)

Chromosome number: $2n=10$ (Pak and Kawano, 1990).

Specimens examined. JAPAN. Okayama: Nimi City, Tanagase, limestone weathered soil, 13 Sept. 1958, *T. Shimizu 3247* (KYO); Ikura, in crevices on limestone cliff, 11 Nov. 1962, *S. Kitamura s. n.*

(KYO).

Dubious species

- Ixeris afghanica* Rech. f., Dan. Biol. Skr. 8, 2: 211 (1955).
Ixeris humifusa (Dunn) Stebb., J. Bot. 75: 50 (1937)—*Lactuca humifusa* Dunn, J. Linn. Soc., Bot. 35: 512 (1903).
Ixeris integra (Merr.) Stebb., J. Bot. 75: 50 (1937)—*Lactuca integra* Merr. Philip. J. Sci. 20: 475 (1922).
Ixeris parishii (Craib) Kitam., Acta Phytotax. Geobot. 23: 140 (1969)—*Lactuca parishii* Craib, in Hoss. Bot. Centralb. Beih. 28: 457 (1911)
Ixeris podlechii Rech. f., Fl. Iranica 122: 220 (1977)—*Ixeris retrorsidens* (Merr.) Stebb., J. Bot. 75: 50 (1937)—*Lactuca retrorsidens* Merr., J. As. Soc. Straits 77: 245 (1917).
Ixeris stebbinsi Hand.-Mazz., Acta Hort. Gotoburg. 12: 353 (1938)—*Crepis stolonifera* H. Lév., Fedde, Rep. Sp. Nov. 12: 531 (1913).
Ixeris tapetodes (Boiss.) Rech. f., Fl. Iranica 122: 219 (1977)—*Zollikoferia tapetodes* Boiss., Fl. Or. Suppl. 324 (1888).

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REFERENCES

- Asano, A. (1960) Maritime plants and chromosome. Iden 14: 29-32 (in Japanese).
 Baranov, A. I. (1961) Two new and rare plants from China. Feddes Repert. 63: 287-290.
 ———. (1962) A critical note on *Lactuca saxatilis* Bar. and *L. chelidoniifolia* Makino. Jap. J. Bot. 37: 161-167.
 Babcock, E. B., G. L. Stebbins, Jr. and J. A. Jenkins. (1937) Chromosome and phylogeny in some genera of the Crepidinae. Cytologia, Fujii Jub. Vol.: 188-210.
 Chuang, T. I., C. Y. Chao, W. L. Hu and S. C. Kwan. (1962) Chromosome numbers of the vascular plants of Taiwan I. Taiwania 8: 51-66.
 Fujishima, H. (1984) Karyomorphological studies of the *Ixeris dentata* complex on Mount Ishizuchi. Bot. Mag. Tokyo 97: 137-150.
 Hsu, C.-C. (1967) Preliminary chromosome studies on the vascular plants of Taiwan (I). Taiwania 13: 117-129.
 ———. (1970) Preliminary chromosome studies on the vascular plants of Taiwan (III). The family Compositae. Taiwania 15: 17-29.
 Ishikawa, M. (1911) Über die Chromosomenzahlen von einigen Compositen. Bot. Mag. Tokyo 25: 399 (in Japanese).
 ———. (1916) A list of the number of chromosome. Bot. Mag. Tokyo 30: 404-448, pl. I.
 ———. (1921) On the chromosome of *Lactuca* (A preliminary note). Bot. Mag. Tokyo 35: 153-158

- (in Japanese).
- Jinno, T. (1953) Chromosome of maritime plants (I). La Kromosomo **17-19**: 696-698.
- Kawano, S. (1961) Brief notes on the chromosomes of some Japanese plants (1). Jap. J. Bot. **36**: 29-32.
- Kitamura, S. (1956) Compositae Japonica, pars Quinta, Mem. Coll. Sci., Kyoto, Imp. Univ., Ser B, Biol. **23**:116-123.
- Koyama, H. (1978) Distribution of diploids, triploids, and tetraploids identified by pollen grains in *Ixeris dentata* (Thunb.) Nakai s. lat. in Japan. Proc. Jap. Soc. Pl. Taxon. **4**: 1-3 (in Japanese).
- Lee, Y. (1971) Chromosome numbers of flowering plants in Korea (4). J. Kor. Res. Inst. **8**: 41-51 (in Korean).
- Nishikawa, T. (1979) Chromosome counts of flowering plants of Hokkaido (2). Rep. Taisetsuzan Inst. Sci. **14**: 15-23 (in Japanese).
- . (1984) Chromosome counts of flowering plants of Hokkaido (7). J. Hokkaido Univ. Educ., Sect. IIB, **35**: 31-42 (in Japanese).
- Nisioka, T. (1956) Karyotype analysis in Japanese Cichorieae. Bot. Mag. Tokyo **69**: 586-591 (in Japanese).
- . (1960) Phylogenetic studies in the *Ixeris dentata* group. 1. Hybridization between the alpine and seashore plants and some other observations. Bot. Mag. Tokyo **73**: 431-437 (in Japanese).
- . (1963) Phylogenetic study in the *Ixeris dentata* group II. General aspect of the *Ixeris dentata* group. Jap. J. Bot. **18**: 199-223.
- Okabe, S. (1932) Parthenogenesis bei *Ixeris dentata* Nakai (Vor laufige Mitteilung). Bot. Mag. Tokyo **46**: 518-523 (in Japanese).
- . (1935) On the *Ixeris dentata* group of alpine zone. Seitagaku-Kenkyu **1**: 280-283 (in Japanese).
- Ono, H. (1941) Zytologische Studien an Cichorieae III. Das Karyotyp und die Befruchtungsweise von *Ixeris dentata*. Bot. Mag. Tokyo **55**: 17-24.
- Ono, M. (1975a) Chromosome numbers of some endemic species of the Bonin Islands I. Bot. Mag. Tokyo **88**: 323-328.
- . (1975b) Cytotaxonomical studies on the flowering plants endemic to the Bonin Islands. Mem. Nat. Sci. Mus. (Japan) **10**: 63-80.
- and Y. Masuda. (1981) Chromosome number of some endemic species of the Bonin Islands II. Ogasawara Res. **4**: 1-24.
- Pak, J.-H. and S. Kawano. (1990a) Biosystematic studies on the genus *Ixeris* and its allied genera (Compositae-Lactuceae). I. Fruit wall anatomy and its taxonomic implications. Acta Phytotax Geobot. **41**:43-60.
- and ———. (1990b) Biosystematic studies of on the genus *Ixeris* and its allied genera (Compositae; Lactuceae). II. Karyological analyses. Cytologia **55**:553-570.
- and ———. (1990c) Biosystematic studies of on the genus *Ixeris* and its allied genera (Compositae; Lactuceae). III. Fruit wall anatomy and karyology of *Crepidiastrum* and *Paraixeris* and their taxonomic implication. Acta Phytotax. Geobot. **41**:109-128.
- . (1991) Karyomorphology of *Youngia koidzumiana* (Compositae; Lactuceae). Kor. J. Plant Tax. **21**: 117-121
- Stebbins, G. L., Jr. (1937) Critical note on the genus *Ixeris*. J. Bot. **75**:43-51.
- , J. A. Jenkins and M. S. Walters. 1953. Chromosome and phylogeny in the Compositae, tribe Cichorieae. Univ. Calif. Publ. Bot. **26**: 401-429.
- Sakai, B. 1962. The patterns of achromatic segments in *Crepidiastrum* chromosomes. Chrom. Inform. Serv. **3**: 44-45.
- Tahara, M. and M. Ishikawa. (1911) The number of chromosome of *Crepis lanceolata* var.

platyphyllum. Bot. Mag. Tokyo **25**: 119-121 (in Japanese).

Volkova, S. V. and E. V. Boyko. (1986) Chromosome numbers in some species of Asteraceae family from the southern part of the Soviet Far East. Bot. Zurn. SSSR **71**: 1693 (in Russian).

Yahara, T., H. Ohba and J. Murata. (1987) Taxonomic review of vascular plants endemic to Yakushima Island. J. Fac. Sci., Univ. Tokyo, Sect. III. **14**: 69-119.

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