Shinobu AKIYAMA* & Hideaki OHBA*: **Studies on hybrids in the genus *Lespedeza* sect. Macrolespedeza (2)** A hybrid swarm between *L. homoloba* Nakai and *L. kiusiana* Nakai**

秋山 忍*・大場秀章*: ハギ属ヤマハギ節の雑種について (2) ツクシハギとビッチュウヤマハギの雑種

There are some specimens showing intermediate appearances between *Lespedeza homoloba* Nakai and *L. kiusiana* Nakai in the area where the two species overlap in distribution (Fig. 1). These specimens, judged from determination on slips, have been treated as *L. homoloba* Nakai itself (by Hatusima or Hiyama) or a glabrescent form of *L. japonica* L. H. Bailey (by Hiyama)[1], etc. Recently we noticed certain populations including intermediate plants in various degrees between *L. homoloba* and *L. kiusiana*.

These populations were expected to be hybrid swarms, so we investigated floral and vegetative features and pollen fertility mainly upon one of such populations, which was collected by us at Kamogawa-machi, Mitsu-gun, Okayama Pref. This population was found at a new clearing by the roadside and consisted of ten flowering individuals (Ohba & Akiyama 700-709).

Flower (Figs. 2 & 3). In the floral characters the shape of the standard auricle is recognized to be most significant between the two species concerned. *L. homoloba* is characterized by larger and reniform auricles, while *L. kiusiana* has smaller and narrowly lunate or lunate auricles (Fig. 2d). The shape of auricles of nos. 702, 704 and 705 falls into the variation range of *L. homoloba*, and among these no. 705 agrees well with the typical shape of the species. On the other hand nos. 700, 701, 703 and 709 are considered to be included in the variation range of *L. kiusiana*, and particularly the narrowly lunate auricle of no. 701 is characteristic of *L. kiusiana*. In the population concerned, however,

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[1] *Lespedeza kiusiana* Nakai seems to be regarded as a synonym of *L. japonica* L. H. Bailey by Hiyama.

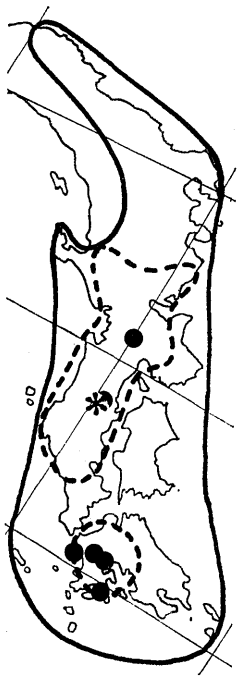

Fig. 1. Distribution of *Lespedeza homoloba* Nakai (——), *L. kiusiana* Nakai (---) and the putative hybrid between them (●) in Japan; (✳) the population at Kamogawa-machi, Okayama Pref.

the shape is better recognized to vary continuously from one to another through the various intermediate appearances shown in nos. 706, 707 and 708 (Fig. 3d).

The relative length and shape of calyx-lobes are secondarily significant in these two species but also variable in this population (Fig. 3e). In nos. 700, 701, 706, 707 and 709 the calyx-lobes are much longer than the tube, and the shape is narrowly triangular with acute apex. So these plants show the same appearances with *L. kiusiana* in these two characters. On the other hand, in nos. 703, 704 and 705 the calyx-lobes are as long as or slightly longer than the tube and the shape is oblong or elliptic as shown in *L. homoloba*, but somewhat acute at the apex. The calyces of nos. 702 and 708, however, show rather intermediate appearances between the two species.

Hairiness of leaf. In the sect. Macrolespedeza the morphological features of the leaf hairs cannot be specifically distinguished each other even by scanning electron microscope. But in appearances *L. homoloba* is not hairy at all on the upper surface of leaf, except by and on the midrib where sometimes it bears a few hairs (Fig. 4A-D), while *L. kiusiana* has always dense, adpressed, short hairs. Its density at flowering is more than 40/mm^2 and often exceeds 100/mm^2 (Fig. 4E-H). So the presence and density of hairs on upper surface of leaf are significant to distinguish at least these two species. On the population concerned, however, nos. 703 (Fig. 5A) and 705 are entirely glabrous, nos. 700 (Fig. 5C), 701 and 709 are densely hairy, but in density nos. 702, 704, 706 (Fig. 5B), 707 and 708 show intermediate appearances varing between less than 1/mm^2 and 20/mm^2 (Fig. 4I).

Pollen. Pollen from herbarium specimens was examined using photomicroscope with cotton blue-lactophenol solution. The percentages of stainability of *L. homoloba* and *L. kiusiana* are both more than 90%. In this population the pollen stainability, which could be studied on only six individuals, varies

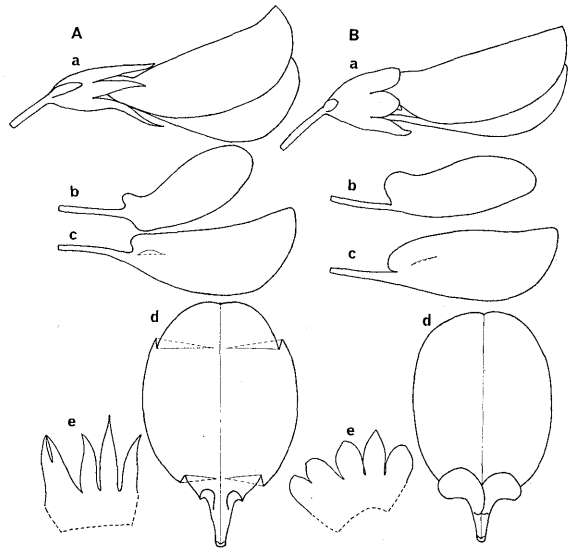

Fig. 2. The representative form of the flowers of both *L. kiusiana* and *L. homoloba* collected in the area where they overlap in their distribution. A. *L. kiusiana* (Okayama Pref., Mitsu-gun, Mitsu-machi, Ohba & Akiyama 600, TI). B. *L. homoloba* (Okayama Pref., Jôbô-gun, Kayô-machi, Ohba & Akiyama 714, TI). a, flower; b, wing; c, keel-petal; d, standard (opened); e, calyx (dissected). All ×3.

between 9.2% and 98.2%. Four of them (nos. 704, 705, 706 and 707) show high stainability (93.0-98.2%) and are considered to be fertile; one of them (no. 709) shows somewhat lower stainability (79.0%) compared with the normal individuals of the Macrolespedeza species; and the remain (no. 702) shows far lower stainability (9.2%) and is considered to be nearly sterile.

We also examined the herbarium specimens which are suspected as the hybrids between these two species. Surely they show the intermediate of morphological features together with pollens either higher or much reduced fertility.

Discussion. As discussed in the preceding paper (Akiyama & Ohba 1982), the interspecific hybridization is strongly supported by morphological intermediate appearances and lower pollen stainability in the sect. Macrolespedeza. The hybrid is expected to occur in the overlapping area of distributions of the parent species. As the results of our investigation we are better to under-

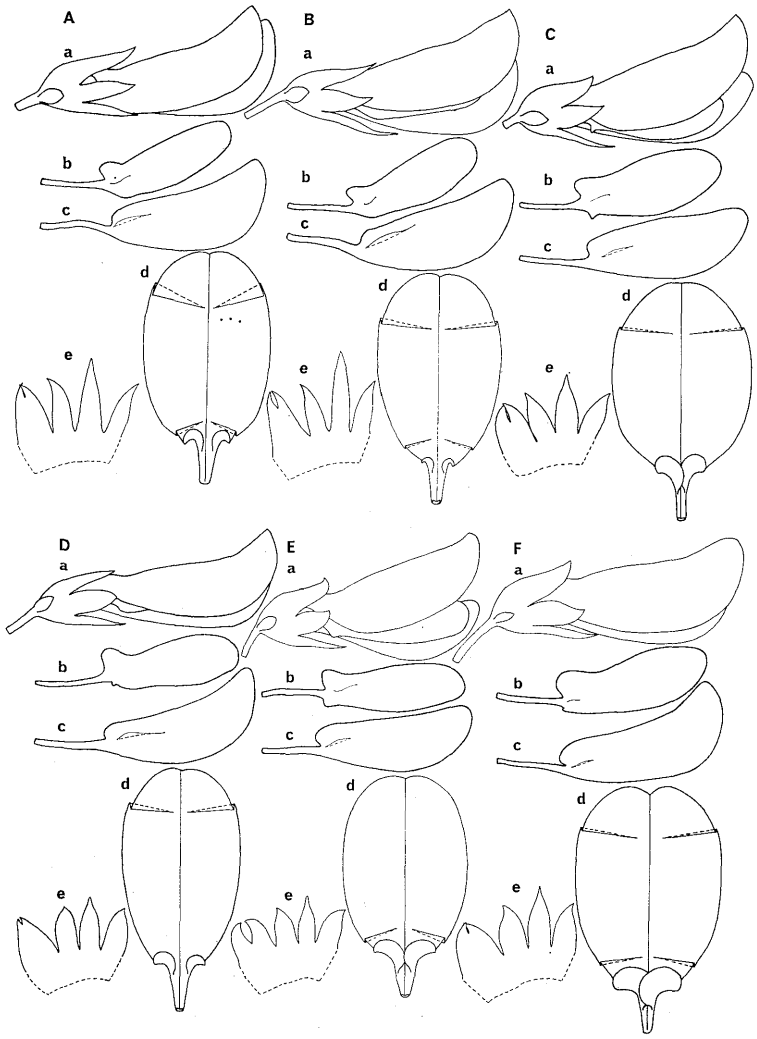

Fig. 3. Flowers taken from all individuals consisting of the hybrid swarm between *L. homoloba* and *L. kiusiana* at Kamogawa-machi, Okayama Pref. a, flower; b, wing; c, keel-petal; d, standard (opened); e, calyx (dissected). All ×3. A. Ohba & Akiyama 700. B. 701. C. 702. D. 703. E. 704. F. 705.

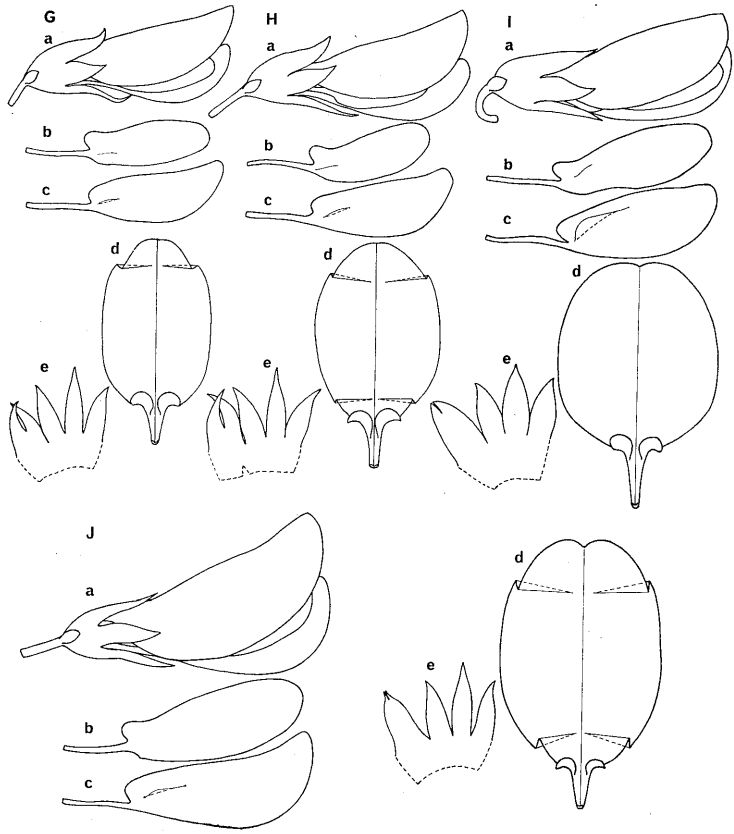

Fig. 3. (continued) G. 706. H. 707. I. 708. J. 709.

stand that the population (also specimens) showing intermediate appearances between *L. homoloba* and *L. kiusiana* has derived from the interspecific hybridization between them. In comparison with *L.*×*cyrto-Buergeri* S. Akiyama et H. Ohba (=*L. Buergeri* Miq. × *L. cyrtobotrya* Miq.), the putative hybrid concerned is different from that to show wider range of variabilities in both morphological appearances and pollen stainability. It is also remarkable that the hybrid does not always accompany with the reduction of pollen fertility. So we may possibly suppose that the wideness of variabilities has resulted from introgressive hybridization between the two species (Anderson & Hubricht 1938).

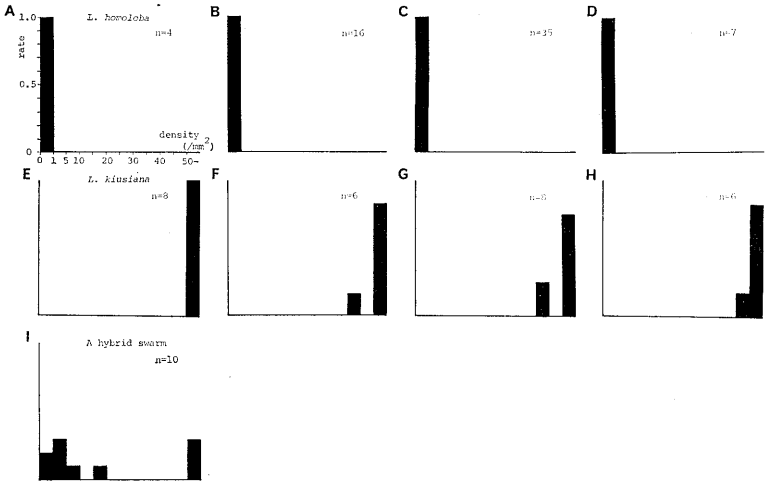

Fig. 4. The density of the hairs on the upper surface of leaves. A-D. *L. homoloba*. A. Kawasaki population (Miyagi Pref., Shibata-gun). B. Tahara population (Aichi Pref., Atsumi-gun). C. Yogo population (Shiga Pref., Ika-gun). D. Kayô population (Okayama Pref., Jôbô-gun). E-H. *L. kiusiana*. E. Mitsu population (1) (Okayama Pref., Mitsu-gun). F. Mitsu population (2). G. Amagi population (1) (Fukuoka Pref., Amagi-shi). H. Amagi population (2). I. The hybrid swarm between these two species at Kamogawa-machi (Okayama Pref., Mitsu-gun). "n" denotes a number of individuals.

Lespedeza homoloba Nakai × **L. kiusiana** Nakai

Leaves nearly glabrous to sparsely hairly on the upper surface; leaflet oblong-elliptic with acute-round-retuse apex. Inflorescence sometimes reaches ca 10 cm long at flowering. Calyx 3-4.5 mm long; the lobes 1 to 2 times as long as the tube, elliptic-triangular with acute apex. Standard is as long as or slightly longer or shoter than keel-petal, and much longer than wings (i.e. S≒K>W), clawed at the base; the lamina oblong-elliptic-(ob)ovate, the auricle narrowly lunate-lunate-reniform. Wings clawed; the lamina narrowly oblong-narrowly obovate, longer than the claw. Keel-petal clawed; the lamina elliptic-obovate, longer than the claw. Fruit pubescent, broadly elliptic-elliptic (intermediate form between *L. homoloba* and *L. kiusiana*).

Habitat. Sunny places by the roadside, new clearings, etc.

Representative specimens examined. Japan. Honshu: Kyoto Pref., Kyoto (T. Makino, Sept. 1905, MAK 49465, det. by K. Hiyama as *L. joponica* L.H.

Bailey f. *glabrescens* Hiyama [nom. nud.] in 1967); Okayama Pref., Mitsu-gun, Kamogawa-machi (H. Ohba & S. Akiyama 700-709, TI), loc. cit., Mitsu-machi (H. Ohba & S. Akiyama 678, TI). Kyushu: Fukuoka Pref., Munakata-gun, Ôshima-mura (Y. Nabeshima 1, 10 Sept. 1930, TI), Asakura-gun, Akidzuki-mura (ut 'Kumamoto Pref.') (Unknown coll. は 10, 20 Sept. 1930, TI); Nagasaki Pref., Nagasaki (T. Makino, Sept. 1908, MAK 49467, det. by K. Hiyama as *L. japonica* L.H. Bailey var. *velutina* (Nakai) Hiyama [comb. nud.] f. *glabrescens* Hiyama [nom. nud.] in 1964; by S. Hatusima as *L. homoloba* Nakai in 1966; by K. Hiyama as *L. homoloba* Nakai in 1967); Kumamoto Pref., Tamana-gun, Fumoto-mura (Unknown coll. は 12, 28 Sept. 1930, TI).

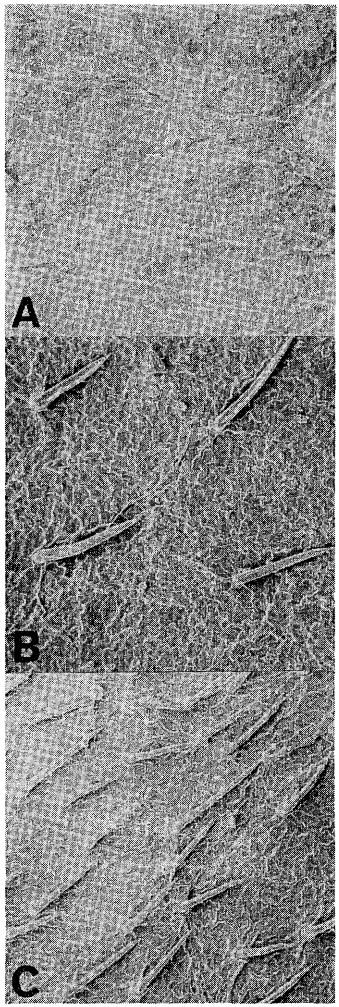

Fig. 5. The upper surface of leaves taken from three individuals consisting of the hybrid swarm at Kamogawa-machi, Okayama Pref. (ca ×16). A. Ohba & Akiyama 703. B. 706. C. 700.

Literature cited

Akiyama, S. & H. Ohba, 1982. J. Jap. Bot. **57**: 232-240. Anderson, E. & L. Hubricht, 1938. Amer. J. Bot. **25**: 396-402.

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ツクシハギとビッチュウヤマハギの雑種と推定される個体について，野外集団と標本にもとづいて検討した。主に調査した集団は10個体からなる岡山県御津郡加茂川町のものである。本雑種は前回報告したオクタマハギとは異なり，1) 1集団に様々な形の中間形が存在すること，2) 花粉は90%以上の正常な稔性を有する個体も少なくないこと（調査した集団では6個体中4個体が93.0～98.2%）から，移入交雑により生じた可能性が示唆されるが，今のところ断

定はできない。このような雑種集団が，ツクシハギとビッチュウヤマハギの分布の重なる地域に散在するため，両2種の識別は時に難しいことがある。特定の学名を与えることは避けたが，便宜上**ビッチュウツクシハギ**の和名を与えることにした。

□唐沢耕司：**パフィオペディルム** (Karasawa, Kōdzi : The genus *Paphiopedilum*) 255 pp. (内 24 pls.) 1982. 誠文堂新光社，東京. ¥2,850. ラン科の中の一属で一冊の本が出せるとは日本も進歩したものであるとは評者一人の考えではあるまい。本書は，30数年前に著者を魅了して以来，その特殊な形態とそれを支える核形態を追及してほとんどの種を一堂に集めたものであって，ことに各種毎に核形態の種々相が述べられている点が異彩を放ち，その点でも類を抜くものである。該属は東南アジアを主産地として約60-80種を産するが，Asher (1980-81) は3亜属82種，Brieger (1971) は4亜属68種にしているものを6亜属70種とし，ことに subgen. Parvisepalum を新らしく記述したが，それは3種で雲南，ヴェトナムの狭域に自生し，時に匍匐茎を具え，上がく片に較べて側花弁が非常に大きく，アツモリソウに似た唇弁で注目される。核型を一々解析して結局は 2n=26 の型に帰せられるとしたのもはっきりした見解である。著書の大半が種並びに亜属や節の詳細な説明に費され，その点で注目されるのみでなく，外部形態，核形態，分布，種分化と核型進化，それに分類とする総論編と共に重要である。付表に分類表，中期染色体の測定値例5種，栽培条件，種名と文献等を列記してあるのも親切である。　　(前川文夫)

□**フロラ福島 Vol. 1** 58 pp. 1982. 福島県植物誌編さん委員会. 福島県植物誌の刊行を目指して長い間熱心に植物調査を続けているアマチュアの方々が中心となって発行した機関誌の第1号。表題が植物誌そのものであるような印象を与えるが，植物誌発行までの研究成果を報告するもので，今後続刊されるという。福島県植物誌は高等植物だけではなく，コケ類，藻類をも含めた総合的なものを目指すと聞くが，本誌もこれを反映して内容は多様である。コケ2，シダ2，種子植物2および高等植物の分布とフロラ3の計9篇の論文に鈴木貞雄氏の発刊のことばがつく。猪苗代湖を分布の境界とする高等植物，阿武隈山地南部のシダ分布，ヒメノヤガラ（ラン科）の発見など，論文の中には地元でなければ得られないような新知見が多く含まれている。福島県植物誌の完成を期待する。本誌の問合せ先は 〒970 いわき市自由ケ丘 10-9 湯沢陽一氏。　(大橋広好)