

Siro KURITA*: **Geoclineal change in the pollen ornamentation
of *Lycoris sanguinea* Maxim. var. *sanguinea***

栗田子郎*: キツネノカミソリの花粉の彫紋にみられる地理的クライン

The geoclineal changes in some morphological and physiological characters have been studied in many organisms (Endler 1977, White 1978). This phenomenon has also been reported in some Japanese plants by some authors. For example, the leaf blade area or size of *Fagus crenata*, *Paris tetraphylla* and *Maiathemum dilatatum* decreases gradually from the north to the south (Ogiwara 1977, Yamanaka 1970, Kawano et al. 1968, 1980).

In this paper, I will report another case of geocline which is observed in the pollen ornamentation of *Lycoris sanguinea* var. *sanguinea*. This is the first report of geocline found at the gametophytic phase in the flowering plants so far known.

Materials and methods Used plants, *L. sanguinea* var. *sanguinea*, were gathered from thirteen localities: Matsukami, Aomori Pref., Konoura, Akita Pref., Senami, Niigata Pref., Kakudayama, Niigata Pref., Kawauchi, Fukushima Pref., Myogisan, Gunma Pref., Ina, Nagano Pref., Noro, Chiba Pref., Nebukawa, Kanagawa Pref., Kikugawa, Shizuoka Pref., Kudoyama, Wakayama Pref., Nakagawa, Fukuoka Pref., and Kujuokubo, Oita Pref. Then they were planted in unglazed potteries and cultivated at the experimental garden of Chiba University. The north latitude of each locality is shown on axis of ordinate of the Fig. 2.

Fresh pollen grains were obtained from the intact anthers, then they were put on the adhesive disks and coated with gold in the ion spatter. Observations were made using a scanning electron microscope.

Observations and discussion As shown in Fig. 1, pollen grains of this species are ellipsoidal and monosulcate. Sulcus elongates to equatorial area of the grain. The mean of longitudinal length of thirty grains from an individual collected at Noro population is 70.3 μm in dry condition. This numerical value

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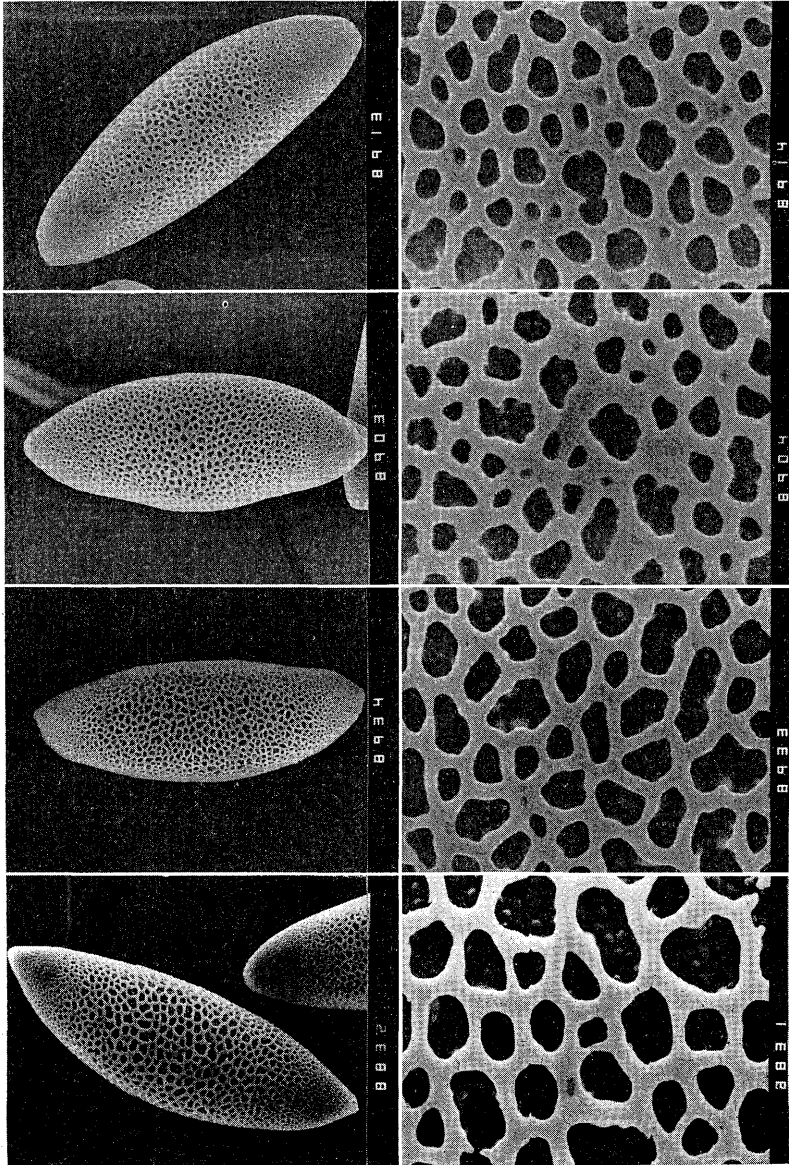


Fig. 1. Local variation in the distal face of *Lycoris* pollen grains.
Left column, $\times 800$; right column, $\times 4000$. Refer to the text.

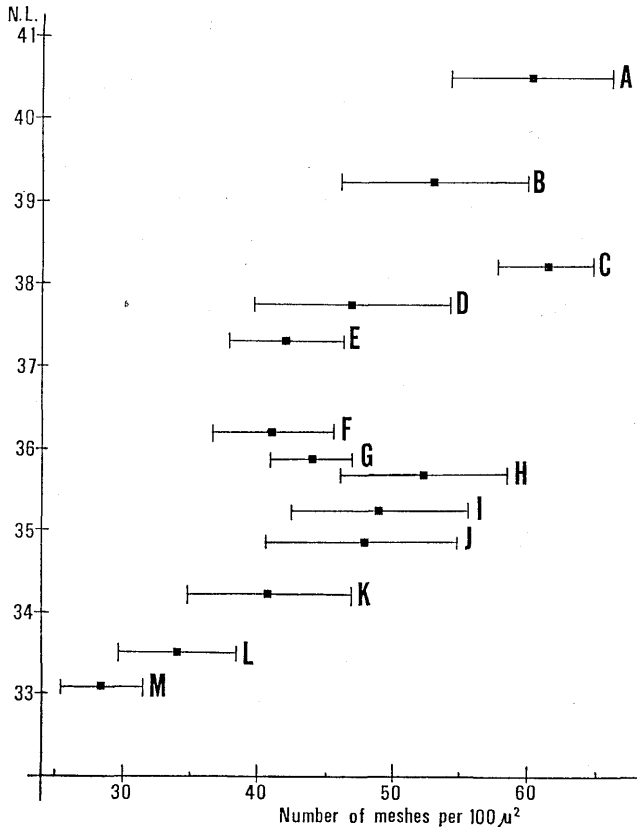


Fig. 2. Mean value and standard deviation of the number of lumen at distal face in an area of about $100 \mu\text{m}^2$. NL indicates the north latitude. Capital letter A to M correspond to each locality. A, Matsukami. B, Konoura. C, Senami. D, Kakudayama. E, Kawauchi. F, Myogisan. G, Ina. H, Noro. I, Nebukawa. J, Kikugawa. K, Kudoyama. L, Nakagawa. M, Kujuokubo.

is almost the same with that of the individuals from other twelve populations. All plants examined are fertile diploids having 22 acrocentric chromosomes.

Exine ornamentation or sculpture is foveolate at equatorial area where the sulcus is ending, and reticulate at side and distal face. The exine layer consists of tectum, columellae and foot layer as is observed in many alliaceous pollen grains. Moreover, there are many small gemmate protrusions on the surface of the foot layer. The size of these protrusions is ranging from $0.1 \mu\text{m}$ to $0.5 \mu\text{m}$

in diameter.

It is very interesting that there are some local variations in the mean size of lumen surrounded by muri of reticulated tectum as shown in Fig. 1. In this figure, the left column shows distal view of the pollen grains and the right column shows a part of the reticulate sculpture. The first row of two photos (8913 and 8914) shows a pollen grain from Matsukami population, the second row (8903 and 8904) shows a grain from Noro population. The third row (8933 and 8934) shows a grain from Kudoyama population, and the fourth row (8831 and 8832) shows a grain from Nakagawa population.

For comparison, I calculate mean number of lumen in an area of about $100 \mu\text{m}^2$ at the distal face of each twenty pollen grains of every individual from thirteen localities. The calculated numerical values in each population are as follows: those of Matsukami, Konoura, Senami, Kakudayama, Kawauchi, Myogisan, Ina, Nebukawa, Kikugawa, Kudoyama, Nakagawa, and Kujuokubo are 60.2 (± 8.5), 52.8 (± 7.4), 61.2 (± 3.5), 46.8 (± 7.4), 42.3 (± 4.2), 40.9 (± 4.6), 43.8 (± 3.0), 52.2 (± 6.2), 49.1 (± 6.7), 47.8 (± 7.9), 40.6 (± 6.4), 33.9 (± 4.4), and 28.3 (± 3.1) respectively. The numbers in parentheses are standard deviation. These data are summarized in Fig. 2. Capital letters, A to M, in the figure indicate thirteen localities mentioned above.

The presence of geolatitudeal cline in these local variations can easily be supposed. Moreover, it is also observed that the amount of gemmate protrusion on the foot layer shows the same type of clinal change as shown in Fig. 1. However, the reason why such geolatitudeal cline in pollen ornamentation has been evolved in this plant is unknown. What kinds of selective pressure are effective for such character? Do pollinators or atmospheric phenomena affect it? It remains to be proved.

References

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phylla A. Gray. Jour. Jap. Bot. 45: 21-29 (in Japanese). White, M. J. D. 1978. Modes of speciation. Freeman and Company, San Francisco.

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キツネノカミソリの花粉の exine は tectum, columellae, および foot layer からなり, その遠心面にある網目模様地理的な変異が観察された (Fig. 1)。遠心面中央部の 100 平方ミクロン内の網目の数の平均値を測定し, 採集地の緯度の順に配置すると, 明白なクラインを示した (Fig. 2)。

□ Heywood, V. H. & D. M. Moore (ed.): **Current concepts in plant taxonomy** 432 pp. 1984. Academic Press, London. ¥17,000. 1982年に表記題名の国際会議が開催されたが, 本書はそこで発表された論文の集成で, 20の論文が掲載されている。

V. H. Heywood による基調論文, “The current scene in plant taxonomy” (最近15年間における種々な分類学方法論の進歩をふり返ったもの) に続き, ハーバリウム, 図書館, 植物園と分類学, 形態及び解剖学と分類学, データー・プロセスと分類学, 分類学の優先性など, 7テーマについて各々2-5編の論文がある。 (井上 浩)

□ Thomson, J. W.: **American arctic lichens I. The macrolichens** i-xiii+504 pp. 1984. Columbia Univ. Press, New York. \$71.50. 1950年カナダ, マニトバの Churchill 近郊における著者の最初の極地地衣類の調査以来, 35年間にわたる研究成果をまとめたマニュアルである。この間, 著者は10回近くアメリカ北極地域を調査し, また, 比較のためにヨーロッパ極地も実際に調査し, さらに各地の標本庫で標本の研究を行なうなど, 長年月にわたって不断の努力を重ねてきたことに, まず敬意を表わしたい。本書では, American arctic の大型地衣類として62属が扱われており, 属 (1部に種を含む) の検索表に続いて, 属および種をアルファベット順に配列し, 属にはその特徴と種の検索表, 各々の種には主な文献, 記載文とともに分類や分布などについてのノートがある。また, American arctic における分布図が種ごとに示され, さらに大部分の種について, B. Brehmer や L. C. Taylor 等による素晴らしい図がある。著者は1958年のアラスカにおける採集品にもとづいて, すでに *Lichens of the Alaskan arctic slope* i-xv+314 pp. 1979. Univ. of Toronto Press, Toronto を著わしているが, これに比べると対象地域も格段に広められ, 扱われている種の数も多くなっている。例えば, 北極圏で普通に見られるハナゴケ属についていえば, 1979年版の42種から62種へ, *Bryoria* (ハリガネキノリ属) では6種から13種へとふえている。これらの種のなかには, 日本の高山との共通種も多数含まれ, 参考になる点が多い。なお, 本書は2巻で完結するように計画されており, II. *Microlichens* の完成, 出版が待たれる。 (黒川 進)