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Masahide KURITA* : Some Notes on the *Rhododendron* Plants from Japan XVIII. Divergent Hairs in Two Species

栗田正秀* : 日本産ツツジ属植物雑報(十八) 二種における開出毛

It is well known that the hair type can be used as an important diagnostic character in the classification of the genus *Rhododendron*. The hairs in the genus are various in form and function, and they are classified into different categories based on their features. According to the angle between hair and epidermis from which the hair arises, the hairs are classified into two different groups: divergent and prostrate hair types. The former shows a large angle and the latter a small angle.

This study was carried out on clearly divergent hairs of two *Rhododendron* species. The result will be noted in this paper.

Materials

Rhododendron pentaphyllum MAXIM. var. *nikoense* KOMATSU and *Rh. quinquefolium* BISSET et MOORE were selected as materials for this study. Both grew wild on Mt. Gozaisho, Komono-cho, Mie Prefecture. The divergent hairs studied were obtained from the base of the

midrib on the abaxial side of each leaf (Fig. 1, A and C), which was collected in middle and late September, 1983.

Observation

1. Form and manner of hair growth

There is no fundamental difference in the form and the manner between the two species.

The divergent hairs are unicellular (Fig. 1, B and D), while a false partition is very rarely found at the central part of the hair. The length of the hair is fairly uniform (about 0.55 mm), and is much longer than that of the other unicellular hair in both species. The outer surface of the divergent hairs have many small warts which are often slightly elongated in parallel with an axis of the hair.

An exact area producing the divergent hairs will be shown in a cross section of a basal part of lamina. As known from Fig. 1 E, the hairs arise from a narrow area just under the intersection of an outline of midrib and an abaxial surface of lamina. The angle between the hair and the epidermis is large, being nearly 90° or so in many cases.

The divergent hairs have a decided tendency to appear in groups of which each consists of two to four, rarely five hairs (Fig. 1, B and D). The bases of these hairs are closely combined with one another into a single group.

2. Frequency of appearance

Every twig of the two species has five leaves which show nearly a verticillate phyllotaxis. In regard to a single twig, three cases will be considered as follows: 1) all the five leaves have the divergent hairs, 2) some leaves have the hairs and the rest no hairs, and 3) all the leaves have no hairs. In fact, the third case was not found to occur.

Table 1 shows the result of observation on the leaves of *Rh. pentaphyllum* var. *nikoense*. In this

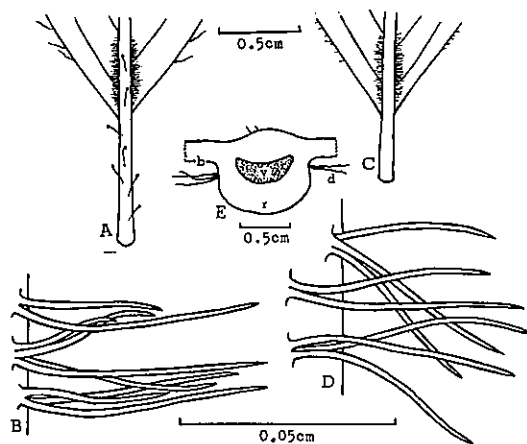


Fig. 1. Divergent hair of *Rhododendron pentaphyllum* var. *nikoense* (A and B) and *Rh. quinquefolium* (C-E). A and C, Basal part of a leaf as seen from abaxial side. B and D, Divergent hair. E, Cross section of basal part of lamina. b, Abaxial surface of lamina. d, Divergent hair. r, Midrib. v, Vascular bundle.

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Table 1. Investigation in *Rh. pentaphyllum* var. *nikoense*.

Individual	The number of leaves with divergent hair (%)	The number of leaves without divergent hair (%)
I	133 (78.70)	36 (21.30)
II	160 (95.81)	7 (4.19)
III	127 (94.78)	7 (5.22)
IV	100 (94.34)	6 (5.66)
V	130 (86.09)	21 (13.91)
VI	161 (95.27)	8 (4.73)
VII	154 (91.67)	14 (8.33)
VIII	144 (91.72)	13 (8.28)
IX	161 (92.00)	14 (8.00)
X	151 (93.79)	10 (6.21)
Total	1421 (91.27)	136 (8.73)

Table 2. Investigation in *Rh. quinquefolium*.

Individual	The number of leaves with divergent hair (%)	The number of leaves without divergent hair (%)
I	141 (100)	0 (0)
II	155 (98.73)	2 (1.27)
III	197 (99.49)	1 (0.51)
IV	216 (100)	0 (0)
V	215 (99.08)	2 (0.92)
VI	166 (100)	0 (0)
VII	194 (99.49)	1 (0.51)
VIII	204 (100)	0 (0)
IX	180 (97.30)	5 (2.70)
X	168 (100)	0 (0)
Total	1836 (99.40)	11 (0.60)

species, the ratio of leaves without divergent hairs to leaves with them is considerably variable among the sampled individuals, varying from 21.30% to 4.19% of the leaves observed in a respective individual. The total average in ten individuals with leaves without divergent hairs reached 8.73% of all the leaves observed (Table 1).

The result of observation in *Rh. quinquefolium* is shown in Table 2. In this species, the ratio of the leaves without divergent hairs varies from 2.70 to zero in percentage among the sampled individuals. *Rh. quinquefolium* is not so variable as *Rh. pentaphyllum* var. *nikoense*. The total average in ten individuals was 0.60% of all the leaves observed. This percentage is much less than the 8.73% obtained in *Rh. pentaphyllum* var. *nikoense* (Tables 1, 2).

Discussion

In *Rh. pentaphyllum* var. *nikoense* and *Rh. quinquefolium*, the divergent hairs studied are unicellular. They were found to have a decided tendency to appear in a group which consisted of two to four, rarely five hairs. The hairs in a single group are fastened together at their bases. The fact that the unicellular hairs are not solitary but clustered is considered to show an intermediate condition between a true unicellular and a multicellular hair pattern. This type of intermediate hair seems to be rare in the genus *Rhododendron*, and differs from a few examples reported by HEDEGAARD (1980).

The ratio of leaves without divergent hairs to leaves with them is larger in any individual of *Rh. pentaphyllum* var. *nikoense* than in any individual of *Rh. quinquefolium*, so far as the present author has studied. In the former species, the leaves without divergent hairs occurred in 8.73% of all the leaves observed

and this percentage is much larger than the 0.60% obtained in the latter species. From the above fact, it may be considered that the production of divergent hair is weaker in *Rh. pentaphyllum* var. *nikoense* than in *Rh. quinquefolium*. The above mentioned difference concerning divergent hairs may be one of characteristics for distinguishing *Rh. pentaphyllum* var. *nikoense* from *Rh. quinquefolium*.

In the sampled plants of both species, the leaves with divergent hairs are more than 90% of all the leaves observed. There are, however, few descriptions of species in which the divergent hairs are specified. This may probably show that a number of individuals without those hairs may grow elsewhere. The present study was carried out on the material plants collected from Mt. Gozaisho only. There is a necessity to study

materials from the other localities.

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三重県御在所山産のアカヤシオとゴヨウツツジとで、その葉の裏面中肋基部にある開出毛が観察・調査された。

両種の開出毛はいずれも単細胞で、単独・孤立しているのは稀で、2—4本、稀に5本がその基部で合着し、群をつくる傾向がたいへん強い。この群は単細胞毛と多細胞毛との中間形と考えられ興味ふかい。

アカヤシオでは開出毛をもたない葉の割合は個体により4.19%から21.30%まで変化し、全調査葉の8.73%であった。これに対しゴヨウツツジでは開出毛のない葉は個体により0%から2.70%までのせまい変化をし、全調査葉のわずかに0.60%であった。上述から開出毛を発生する能力がアカヤシオではゴヨウツツジより弱いものとおもわれる。

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