Some Notes on the Rhododendron Plants from Japan XI: Vascular Bundles in Petioles of Six Species

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Masahide KURITA*: Some Notes on the *Rhododendron* Plants from Japan XI. Vascular Bundles in Petioles of Six Species

栗田正秀*：日本産ツツジ属植物雑報（十一）　六種の葉柄における維管束

It is well known that a number and an arrangement of vascular bundles in a petiole are significant to taxonomy and phylogeny. The anatomical feature of petiolar bundle is desirable to be extensively studied in more various plants as noted by TAMURA (1962) in his study on *Ranunculaceae.* According to ESAU (1965), the petiolar bundle may form a circle, sometimes with additional bundle within the circle and outside it. Genus *Rhododendron* is given as one example of genera showing such a feature as mentioned above.

A study was made on the petiolar vascular bundle, together with the bundle in lamina base, of 6 species in the genus *Rhododendron.* The result will be noted in this paper.

Materials and Method

The plants used are *Rhododendron brachycarpum* D. DON var. *roseum* KOIDZ., *Rh. metternichii* SIEB. et ZUCC. var. *pentamerum* MAXIM., *Rh. indicum* (LINN.) SWEET, *Rh. pentaphyllum* MAXIM. var. *nikoense* KOMATSU, *Rh. quinquefolium* BISSET et MOORE, and *Rh. decandrum* MAKINO. The first and the second plant were cultivated at Yugashima, Shizuoka Prefecture, the third cultivated at Yokkaichi, Mie Pref., and the others were growing wild at Mt. Gozaisho, Mie Pref.

The material petioles with bases of laminas were obtained from fully developed leaves of each species. The petiolar lengths are shown in Table 1.

Table 1.

Species	Length of petiole (cm)
Rhododendron brachycarpum var. *roseum*	2.0
Rh. metternichii var. *pentamerum*	2.0
Rh. indicum	0.2
Rh. pentaphyllum var. *nikoense*	0.5
Rh. quinquefolium	0.3
Rh. decandrum	0.9

A cross-section for an observation was made through the following points: 1) a base of petiole (this section being termed BP-section in this paper), 2) a base of lamina (termed BL-section), and 3) 2 or 3 points where a petiole is divided into 3 or 4 parts equal in length (termed I-, II-section or I–III-section in order from a base of petiole).

Observation

1. *Rh. metternichii* var. *pentamerum* (Fig. 1) and *Rh. brachycarpum* var. *roseum.*

In the former species, BP-section shows one large vascular bundle of a crescent-shape at its center, and one small circular vascular bundle at each side of the large bundle. The small bundles are far away from the large bundle. In a few other BP-sections, 2 or 3 bundles arranged in the crescent-shap are found at the center (Fig. 1, bp). In the case of 3 bundles, the largest bundle is always at the middle of the crescent. In I-section, the large bundle is of an incomplete ring which has an interstice at its upper part, and in II-section, the large bundle becomes a complete ring. Accordingly, a small part of parenchyma together with a bundle sheath is enveloped in the ring of vascular bundle, and the ring has a xylem in its inner part and a phloem in its outer part. In the I- and II-section, the small vascular bundle is similar to that in the BP-section. In BL-section, the large vascular bundle shows no difference from that in the II-section, and each of the small vascular bundles is, however, found to have been divided into 2 subbundles.

There is found no difference in a vascular bundle between *Rh. metternichii* var. *pentamerum* and *Rh. brachycarpum* var. *roseum.*

2. *Rh. indicum* (Fig. 2)

In BP-section, only one large

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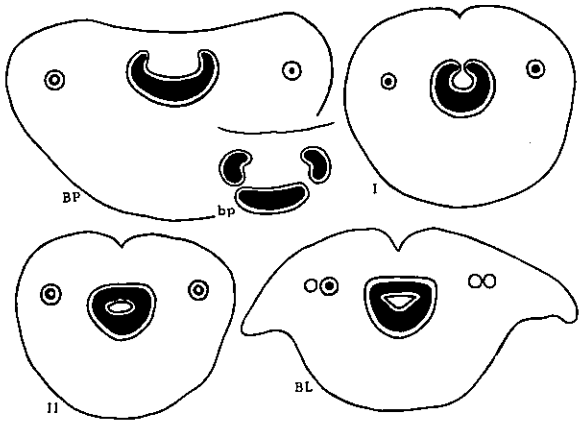

Fig. 1. Cross-sections of petiole as well as lamina-base of *Rh. metternichii* var. *pentamerum*. BP, I, II and BL: Refer to text. bp: 3 elemental bundles in BP-section, uniting to form one large bundle later. × ca. 11

vascular bundle is found at its center, it being roughly hemicircular or triangular. In I-, II- and III-section, only the large bundle is found and shows no difference in shape from that in the BP-section. In BL-section, besides the large bundle, there is found one small circular vascular bundle at each side of the large bundle.

3. *Rh. quinquefolium* (Fig. 3), *Rh. petaphyllum* var. *nikoense* and *Rh. decandrum*

In the first species, BP-section shows only one large vascular bundle of a crescent-shape at its

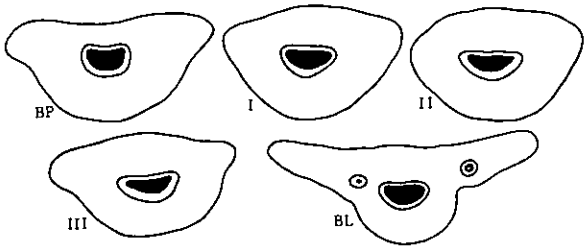

Fig. 2. Cross-sections of petiole as well as lamina-base of *Rh. indicum*. × ca. 20

center. In I- and II-section, a small vascular bundle is almost always found to diverge from a single or both ends of the large main bundle. In some cases, 2 or 3 diverged bundles are found outside a single end of the large main bundle. Some such diverged bundles are rarely found to join with each other or with the large main bundle later (Fig. 3B, I to II). Both the large main bundle and the small bundles are found in BL-section.

The vascular bundle of *Rh. pentaphyllum* var. *nikoense* and *Rh. decandrum* is similar to that of *Rh. quinquefolium* mentioned already, with the exception of a somewhat rare divergence of a bundle in *Rh. decandrum*.

Discussion

According to KITAMURA and MURATA (1974), *Rh. metternichii* var. *pentamerum* and *Rh. brachycarpum* var. *roseum* belong to subgen. Hymenanthes (BLUME) ENDLICHER. ESAU (1977) has noted that the number of leaf traces may vary in same plant at different levels. In the present study, it is not confirmed whether a leaf trace is one or more per a large main vascular bundle in a petiole. In the case of 2 or more leaf traces, these traces are supposed to join with

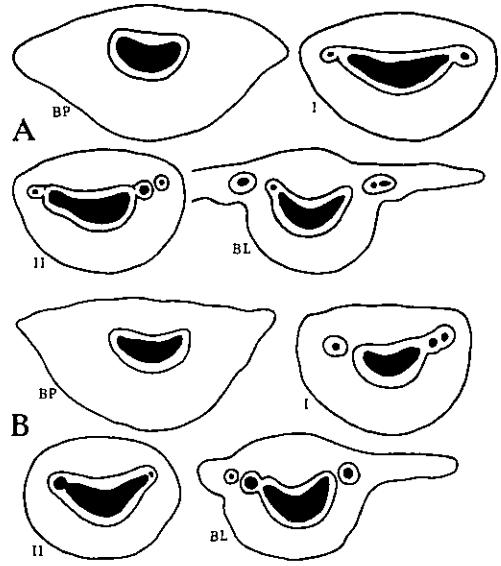

Fig. 3. Cross-sections of petiole as well as lamina-base of *Rh. quinquefolium*. × ca. 20

each other just before or after their penetration into the petiole. Most of BP-sections showed one large main bundle. Therefore, the joining of the traces is considered to occur usually just before the penetration. It may be characteristic of the subgen. Hymenanthes that 1) the large main vascular bundle does not diverge and comes a tube about 2/3 of petiolar length above the base of petioles, and 2) a small circular vascular bundle is found at each side of the large main bundle through the whole length of the petiole, the former bundle being far away from the latter.

Rh. indicum belongs to sect. Tsutsusi (ADAN-

SON) SWEET in subgen. Anthodendron (REICHENBACH) REHDER. BP-, I-, II- and III-section show only one large vascular bundle, and BL-section both the large bundle and the small bundles. Then, the large bundle of this species is characterized by an unbranching through the whole length of petiole except for a transitional part to a lamina.

Rh. quinquefolium and *Rh. decandrum* belong to sect. Sciadorhodion REHDER et WILSON in subgen. Anthodendron, and *Rh. pentaphyllum* var. *nikoense* to sect. Sinenses NAKAI in the same subgenus. In the 3 species, the large vascular bundle of petiole is almost always found to diverge. This divergence is characteristic of these species.

Out of the 6 species studied, *Rh. quinquefolium, Rh. pentaphyllum* var. *nikoense* and *Rh. decandrum* are deciduous, and the 3 remaining species are evergreen. In *Rhododendron,* the deciduous or the evergreen plants may be related to the divergence or the nondivergence from a main vascular bundle in a petiole respectively.

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摘　要

ツツジ属6種の葉柄における維管束が観察された。

シャクナゲ亜属に属するシロバナシャクナゲとアズマシャクナゲにおいては，葉柄下半部では，横断面で三日月形の，上半部では円形となった大きい維管束1本と，この両側におのおの1本の小さい維管束がある。大きい維管束では分岐は全然みられなかった。

ヤマツツジ亜属のヤマツツジ節に属するサツキツツジでは，ほぼ半円形または三角形の大きい維管束が1本あり，これは葉柄先端部で小さい維管束を1回分岐する。同亜属レンゲツツジ節のアカヤシオとオンツツジ節のゴヨウツツジ，トサノミツバツツジの3種では三日月形の大きい維管束が1本あり，この縁から小さい維管束が分岐しているのが，しばしばまたはときどき認められた。分かれた小維管束は後に，互にまたは主維管束に接合することがある。

○ **高越山の自然**　阿部近一監修　日本生物教育学会徳島県支部（〒770 徳島市城南町2丁目2　徳島県立城南高等学校）編（1978年8月9日），A5版，88頁＋索引10頁，非売品。

第25回日本生物教育学会の全国大会が，徳島県立少年自然の家を中心として開かれることになり，その所在地の高越山地域の自然誌を作ろうという声が出て，この書が生れることになった。

高越山は徳島県の吉野川中流の南岸に位置し，標高1122m，山頂近くに名刹高越寺がある。古来，窯山として尊崇され，多くの登山者があった。植物研究者では，阿波藩の命で小原春造がはじめて登山して以来，多くの著名人も採集をこゝろみ，現在ではこの山のフロラはほとんど明らかにされている。

第2章が植物で，第1節の高越山の植物相では植物研究史に引続き植物相の概況と特異な分布を示す植物等を阿部近一氏が記述し，第2節の高越山の植生では植生を概観し，自然植生・代償植生の凡例を石井愃義・友成孟宏・森本康滋氏等が共同で執筆している。また，最後に動物・植物の目録があり，植物ではシダ植物・種子植物の種類を合計すると，135科，512属，950種を数える。

○ **福岡の植物**　第6号　福岡県植物誌編纂委員会（福岡市東区箱崎6の10の1，九州大学農学部造林学教室内，振替口座　福岡5060）発行（1980年5月30日），B5版，104頁，頒価1,200円（送料200円）。

登載論文9篇の内，本会々員の著作は5篇をしめていて，御活躍がめざましい。それらは，小林　繁・麻生千香子：福智山塊産植物目録，筒井貞雄：福岡県のヤブソテツ属，益村　聖：筑後平野南部の堀に見られる植物群落　II，猪上信義：八女郡黒木町南部（山中・渡内地区）の植物，猪上信義：福岡県稀産植物群落調査(1)　ミズワラビである。

なお，バックナンバーは3，4，5号がある由で，各号1,200円（送料200円）。　（里見信生）