

## 日本産ツツジ属植物雑報(二十)：若い茎の表皮

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## Masahide KURITA\* : Some Notes on the *Rhododendron* Plants from Japan XX. Epidermis of Young Stem

栗田正秀\* : 日本産ツツジ属植物雑報 (二十) 若い茎の表皮

Usually no epidermis falls off from one-year-old stem of *Rhododendron* plant. This is especially true of the upper part of the stem. Observations were made on the epidermis of the stem of several *Rhododendron* species and these observations indicate that all the epidermises can be grouped into two different types.

### Materials and Method

The material plants for the present study are the seven following species: *Rhododendron dilatatum* MIQ. var. *decandrum* MAKINO, *Rh. reticulatum*. D. DON, *Rh. obtusum* (LIND.) PLAN. var. *kaempferi* (PLAN.) WILSON, *Rh. macrosepalum* MAX., *Rh. indicum* (L.) SWEET, *Rh. japonicum* (A. GRAY) SURIN. and *Rh. mucronulatum* TURCZ. var. *ciliatum* NAKAI. Out of these species, the last three species were cultivated in certain gardens of Yokkaichi city and its vicinities, and the others grew wild in the latter regions. All the one-year-old stems of each species were collected from the middle to the end of December. The collected stems were strongly developed ones. The microscopic observations were carried out on cross sections of the upper parts of these stems. In this paper, the upper part of stem is a region of a top of stem to a point about 1 cm far from the top and does not yet show a periderm.

### Observations

I) External appearance of the upper part of one-year-old stem.

The upper parts of stems of all the species have at least one of the three following hairs: unicellular hair, multicellular glandular hair and multicellular ordinary hair. Macroscopic ridges are found on the surface of the stem parts of *Rhododendron mucronulatum* var. *ciliatum*, *Rh.*

*dilatatum* var. *decandrum* and *Rh. reticulatum*. The ridges run parallel or nearly so with the long axis of stem. They are scarcely noticeable because of their short length and low height, but are easily recognized. However, such a ridge is not found in the upper stem parts of the four remaining species.

II) Cross section of the upper part of one-year-old stem

1) Observations under the magnifying power of 45×.

As shown in Fig. 1E, the epidermis is wavy in *Rh. mucronulatum* var. *ciliatum*, *Rh. dilatatum* var. *decandrum* and *Rh. reticulatum*, while it is smooth in the four remaining species as shown in Fig. 5E. Needless to say, the waviness and the smoothness are based on the existence and the absence of the already mentioned ridges on the stem surface respectively.

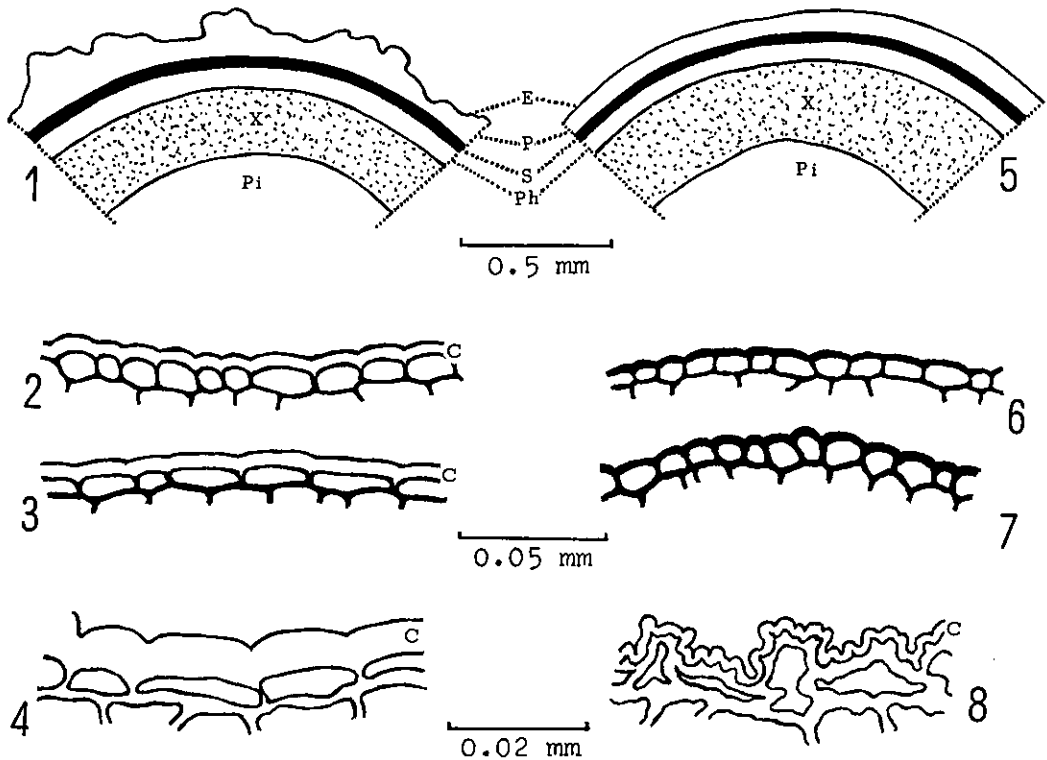
2) Observations under the magnifying power of 430×.

In the sections on which the above observations were made, the parenchymatous cells of cortex in all species showed a yellow-brown to black-brown cell walls and become irregular in shape. They were generally elongated in a tangential direction. The outer cortex cells are sharply pressed down to the epidermis, and consequently these cells are difficult to distinguish from one another.

In the above stage, a sclerenchyma has already developed between the cortex and a phloem, and has completely enveloped a vascular bundle with no gap showing.

In *Rh. mucronulatum* var. *ciliatum*, *Rh. dilatatum* var. *decandrum* and *Rh. reticulatum*, a cutin is largely accumulated on the outer tangential walls of epidermal cells. These walls become

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Figs. 1-8. Epidermis of young stem. 1 and 5: Part of cross-sectioned stem. 2, 3, 6 and 7: Part of cross-sectioned epidermis. 4 and 8: Epidermal cell enlarged. 1, 2 and 4: *Rhododendron dilatatum* var. *decandrum*. 3: *Rh. mucronulatum* var. *ciliatum*. 5 and 6: *Rh. obtusum* var. *kaempferi*. 7 and 8: *Rh. indicum*. E: Epidermis. P: Parenchyma of cortex. S: Sclerenchyma. Ph: Phloem. X: Xylem. Pi: Pith. C: Cuticle.

thick and are remarkably brilliant with a white shine. After soaking the sections in water for about one day, the above mentioned feature of the tangential walls (Fig. 2-3C), is more easily observed due to the restoration in shape of the epidermal cell and of the cortex cells pressed down to the epidermis. On the contrary, such a cutin layer is not recognized in the outer tangential walls of epidermal cells of the four remaining species (Fig. 6, 7).

3) Observations under the magnifying power of 1080 $\times$ .

The outer tangential walls of epidermal cells in *Rh. mucronulatum* var. *ciliatum*, *Rh. dilatatum* var. *decandrum* and *Rh. reticulatum* are clearly found to have a cuticle which has a smooth surface (Fig. 4C) and which is 4.6 $\mu$  to 5.8 $\mu$  thick. A layer consisting only of cellulose is rarely found inside the cuticle. However, the cuticle in the four

remaining species is thin, being about 1.3 $\mu$  thick, and it is finely zigzag as shown in Fig. 8C.

#### Discussion

The discussion will be presented according to various aspects of the stem cross section.

The sclerenchyma, which completely envelops a vascular bundle, is not considered to decrease in diameter of sclerenchymatous circle because the tissue consists of cells with very thick walls attached closely to one another. It is certain that the cortex between the epidermis and the sclerenchyma decreases greatly in width as the parenchymatous cells of cortex lose water and are elongated in a tangential direction, and as some of them are pressed to the epidermis.

In the three following species, *Rh. mucronulatum* var. *ciliatum*, *Rh. dilatatum* var. *decandrum* and *Rh. reticulatum*, the epidermal

cells have very thick and smooth cuticles in the outer tangential walls. Therefore, the circle of epidermis dose not decrease in its circumference. On the other hand, the width of the cortex, which is backed with the sclerenchyma unvariable in length, decreases as time goes by. In these three species it may be thought that the waviness of epidermis occurs as a result of the unbalance between the decrease of cortex width and the stable circumference of the stem epidermal circle. Such an epidermal waviness can be recognized in the stem cross section as a macroscopic ridge on the stem surface.

The four remaining species have a thin and zigzag cuticle in the outer tangential walls of their epidermal cells. The epidermis of these species decreases uniformly in the diameter of epidermal circle. The cortex decreases in width due to the causes already mentioned. There may be kept a balance relationship between the diameter of the epidermal circle and the cortex width. Thus, epidermal waviness in the cross section of stems dose not occur, and the surface of stem does not show a macroscopic ridge.

*Rh. mucronulatum* var. *ciliatum*, *Rh. dilatatum* var. *decandrum* and *Rh. reticulatum* show macroscopic ridges on the surface of the upper parts of their one-year-old stems and have a thick and smooth cuticle in the outer tangential walls of their epidermal cells. On the contrary, the four remaining species show no such macroscopic ridge and furthermore, have a thin and zigzag cuticle in the outer walls of epidermal cells. The above differences between the former and the latter grouped species may be employed as a characteristic for the taxonomy of the genus *Rhododendron*.

## References

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## 摘 要

ツツジ属7種：ゲンカイツツジ，トサノミツバツツジ，コバノミツバツツジ（以上3種を第1群と仮称），ヤマツツジ，モチツツジ，サツキおよびレンゲツツジ（以上4種を第2群と仮称）の1年生茎を12月に採集し，その上端部における表皮を観察した。

第1群の種では表皮に肉眼でも認められる縦皺があり，第2群ではそれが無い。

以下検鏡結果は茎の横断面によって述べる。両群ともに，その皮層細胞は褐色をおび，一般に切線方向に伸ばされ細くなっている。したがって皮層の幅は，その細胞の生活時より短縮しているのはたしかである。第1群の表皮細胞の外側膜は角皮がたいへん厚く，平滑であるから表皮の円周は一定で，短縮するとは考えられない。しかるに，既述のように皮層の幅は短縮するので，表皮の円周の一定と皮層の幅の短縮との間の不均衡によって，第1群では表皮に波状の屈曲が生じ，これが茎表面に肉眼でみられる皺となるのである。第2群の表皮細胞の外側膜では角皮はきわめて薄く，こまかいZ字型をしている。したがって茎が完成するにつれて表皮の円の直径は均一的に短縮し，皮層の幅の短縮との間に均衡がとれて表皮に波状の屈曲はできず，したがって茎表面に肉眼でみられる皺はできないのであろう。

上述のように1) 第1群には表皮に肉眼で認められる皺があるが，第2群にはそれが無い。2) 顕微鏡的には第1群の表皮細胞外側膜の角皮は厚く平滑であるが，第2群のそれはたいへん薄く，こまかいZ字型をしている。これらの両群間の差異は分類上の標徴としてとりあげられるであろう。

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○ 内藤俊彦著 植物の一生 研成社(〒103東京都中央区日本橋蠣殻町1-6-4)，昭和60年2月1日発行。B6版，178頁。980円

植物は種々の環境条件に適応しつつ，種子・胞子から発芽し，生長し，開花し，結実し，子孫を残して枯れてゆくが，本書ではワラビ・ナズナ・タンポポ・チシマザサ・アオモリトドマツ・ブナの6種の一生を，自然に親しめるようにと望みつつ記述した苦心の労作である。

○ 愛知県南設楽郡鳳来町立鳳来寺山自然科学博物館発行 鳳来寺山—その自然をめぐって—，昭和60年4月。B5版，220頁。非売品。

鳳来寺山自然科学博物館は，開館以来20年を経過し，この間に行なわれた多くの行事は，地方文化の推進力として大きな功績を残して来た。本誌はそれを記念して発刊されたもので，内容は地学・植物・人文・博物館活動からなり，植物では本会々員の井波一雄・鳥居喜一の両氏が執筆して居られる。 (里見信生)