

New Diseases of Tea Plant

By SHIGEO TAKAYA

Tea Agronomy Division, National Research Institute of Tea

In recent years, four kinds of new diseases of tea were discovered. As one of them, witches broom, was already reported in this journal, other three diseases, i.e., zonate leaf spot, black rot, and canker will be described in the present paper.

Zonate leaf spot

This disease, reported at first in 1973, was known only in Kagoshima Prefecture at that time. In 1976, however, the disease was detected at two locations in Shizuoka Prefecture, and the incidence in Kagoshima Prefecture spread to a very wide area. Although the affected area is still not large at present, attention is needed because the area shows an increasing tendency.

The disease occurs on leaves disregarding their ages. While almost all of the disease spots on young leaves cease to develop within several mm of diameter, large lesions develop on old leaves, sometimes extending over the whole leaf area, and therefore the disease causes more damage to old leaves than to young leaves. The symptom of the disease on old leaves is as follows: At first, reddish brown, small spots with a diameter of 1-3 mm appear. They expand rapidly, and become round-shaped lesions with a diameter of 10-20 mm after several days. On the lesions, a zonate pattern with clear concentric circle develops, and mushroom-shaped sclerotial bodies with a height of about 0.2 mm are produced in a dotted manner. Leaves with large lesions are very liable to fall.

In Kagoshima, the disease begins to occur in March, reaching its peak occurrence in April and May, and ceases at the end of the

rainy season (Bai-u). Sometimes, it occurs in autumn to a small extent.

The disease dispersal is made by sclerotial bodies produced on the lesions. Incubation period is about 3 days. Because the spore of the pathogenic fungus is not yet confirmed, the taxonomic position of the fungus is not known, although it is presumed to belong to *Cristulariella* or related genus.

It has been observed so far that the disease occurs only in a part of a whole tea field, without the case of extending over a whole field. The reason for that is considered to be a difficulty for dispersal of large sclerotial bodies. However, in infected areas, the disease is very severe, leaving almost no healthy leaves, and plants become naked with only new shoots remaining because all diseased

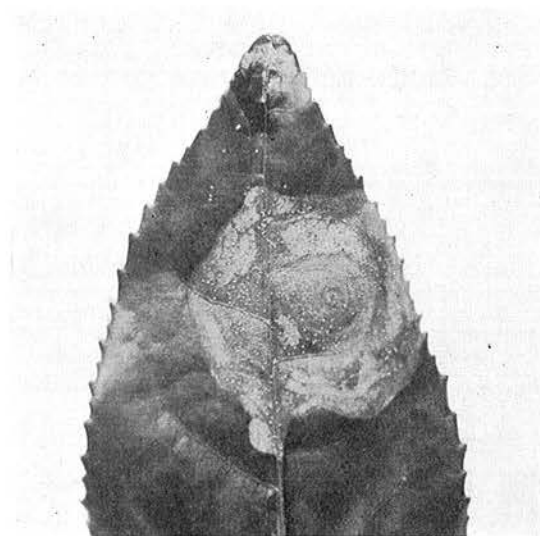


Plate 1. A lesion of zonate leaf spot. Sclerotial bodies are formed scattering on the surface.

(Photo: by the courtesy of Mr. Nonaka)

leaves fall down before long.

Natural infection was recognized with other kinds of plants such as *Camelliae* and azalea. In 1976, a severe outbreak occurred in nursery bed of *Eurya emarginata*, a green tree, in Kagoshima Prefecture.

By comparing several fungicides, it was found that fungicides of MBC group were most effective. However, because of short persistence of their effect, spray at 1-2 times in a summer is not enough. To secure a good control, an intensive spraying for several times starting from the beginning of the disease occurrence is needed.

Black rot

Like zonate leaf spot, this disease also seems to be of an increasing trend, although it is rare at present.

More than 20 years ago, the disease occurred in tea fields at several locations in Shizuoka Prefecture, and it was named black rot based on observations at that time. However, it was only recently that the author had an opportunity to observe this disease, because there had been no occurrence for a long time.

Starting from the occurrence in 1974 at a tea field in Shizuoka Prefecture, the disease was recognized in 1975 in Kagoshima Prefecture and in 1976 in Miyazaki Prefecture.

A large number of minute blackish-brown spots appear on young leaves at first. They merge each other and expand rapidly to form

irregular-shaped lesions. The symptom at this stage reflects the name black rot, showing the lesions with blackish brown color which can best be expressed by the word, rot. Leaf fall occurs seriously. Later, a foam-like, gray-colored crest pattern with minute wrinkles on its surface is developed on the lesions.

The disease is caused by a kind of *Pellicularia*, and is considered to be the same disease as the black rot which has been known from old days as an important disease of tea in India and Sri Lanka, etc.

The disease is likely to occur only under a highly humid condition, such as continuous rain for several days. As the disease spreads by hypha, the incidence is limited to a part of the tea field, not extending over the whole area. At the infected area, the disease is very severe; healthy young leaves are scarcely observed and plants are skeletonized by severe leaf fall, similar to the case of zonate leaf spot disease.

White hyphae elongating as a spider's web are observed with the naked eye on branches and leaves adjacent to the diseased area. Spores are known to exist, but it is not clear whether they can be a source of infection. The disease is quite acute, occurring uniformly within a certain extent of area, as described above, but it seldom repeats the occurrence in the same place. Therefore, the disease seems to be overlooked in many cases, being regarded simply as fertilizer damage or leaf scorch.

Among the fungicides tested, that of MBC group showed the highest effect in controlling the disease, although by the laboratory experiment using artificial inoculation.

Canker

This is a new disease which was recently known to be caused by bacterium. The occurrence is known only in tea fields in Kagoshima Prefecture. At an initial stage of infection, minute, light green, an oil drop-like spots are developed on the lower surface of matured leaves or at the base of new shoots. The lesions swell and expand, becoming finally typical

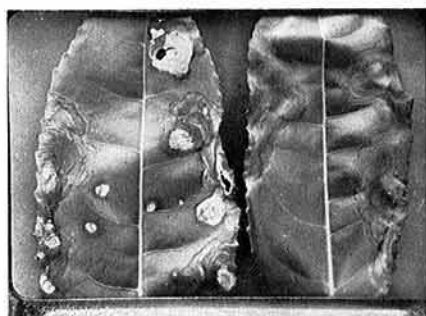


Plate 2. Typical symptom of black rot.
(Photo: by the courtesy of
Dr. Ezuka)

protuberances, which are brown-colored and dried with a diameter of 3–5 mm. Adjacent lesions merge each other sometimes to form large lesions, and in many cases a whole periphery of young shoot is affected. The diseased leaves are liable to fall, particularly in winter, causing the weakening of trees. Lesions on young shoots cause die-back of branches and buds.

The causal bacterium, which had not been known, was denominated as *Xanthomonas theae* Uehara et Arai.

The infection occurs more with first season shoots and autumn shoots, and less in summer season. The younger the leaf is, the more is the susceptibility. Matured leaves after the plucking season are not infected even with wound inoculation. When young leaves are infected, the disease symptom develops after the end of the plucking season, because 10–14 days of incubation period is needed.

The incidence of this disease is more severe with young tea fields or un-managed tea fields where shoots are allowed to elongate without practicing the skiffing, whereas the disease is recognized only on leaves at the skirt of the

plants in ordinarily managed mature tea fields. There is also a tendency that more incidence occurs in the year with strong wind in spring or autumn. This fact suggests that the minute wounds caused by the rubbing of leaves and shoots due to wind serve as the site of infection, like other bacterial diseases of plants.

References

- 1) Nonaka, H. & Uehara, K.: Incidence of a new disease, zonate leaf spot of tea in Japan and the morphology and cultural characters of the pathogenic fungus. *Tea Res. J.*, 46, (In press, 1977) [In Japanese].
- 2) Ezuka, A., Kasai, K. & Kibushi, H.: Incidence of a *Pellicularia* disease (Black rot) of tea plant in Japan. *Tea Res. J.*, 39, 20–22 (1973) [In Japanese with English summary].
- 3) Takaya, S.: Fungicides for the control of black rot of tea. *Tea Res. J.*, (1973) [In Japanese with English summary].
- 4) Nonaka, H. & Uehara, K.: On a new canker disease of tea. *Ann. Phytopath. Soc. Japan*, 39, 144 (abstract) (1973) [In Japanese].
- 5) Uehara, K. et al.: On the pathogen of the canker disease of tea. *Tea Res. J.*, 43, 112 (abstract) (1977) [In Japanese].