

Mycoplasma-like Bodies Associated with Sesame Phyllody in Thailand

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ABSTRACT

A phyllody disease of sesame (*Sesamum indicum*) is reported from Northeast Thailand. Electron microscope studies showed the presence of mycoplasma-like bodies in diseased tissue and not in healthy tissue. No virus particles were observed.

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Sesame (*Sesamum indicum* L.), an annual herbaceous plant, is grown extensively for oil production and food in the central, northern, and northeastern regions of Thailand. In 1967 approximately 34,560 hectares of sesame were

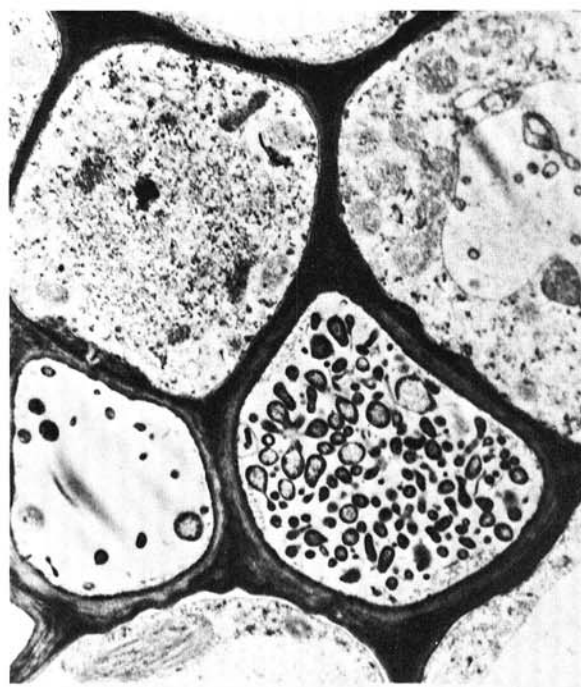


Fig. 2. Mycoplasma-like bodies in phloem cells of a leaf from a sesame plant showing symptoms of phyllody.



Fig. 1. Sesame plants showing symptoms of phyllody (center and right) and a healthy plant on the left.

planted in Thailand and production was reported at 22,700,000 kg, representing a value of approximately 6 million dollars (1).

A phyllody disease of sesame first was observed in Burma in 1928 (8) and later in India in 1930 (3). A similar disease was reported in 1948 in Thailand (4). This disease was observed in a planting of sesame at the Northeast Agricultural Center, Tha Phra, Khon Kaen, Thailand, in 1968. A survey conducted in several provinces in northeastern Thailand during 1969 and 1970 indicated that phyllody was so severe in some areas that farmers decreased their acreage of sesame.

Phyllody has been considered a physiological disease induced by early planting and heavy rainfall (3). Rhind et al. (7) suggested that a combination of genetics and environmental conditions caused phyllody in sesame. The systemic, infectious, and transmissible nature of the disease was shown by the grafting experiments of Pal & Nath (6), who suggested that phyllody was caused by a virus. Vasudeva & Sahambi (9) proved that phyllody is transmitted by a jassid leafhopper (*Deltocephalus* sp.).

The characteristic symptoms of sesame phyllody as observed in Thailand are stunted growth, extreme proliferation of the growing tip, and numerous small leaves, giving the infected plant a witches'-broom effect. Part or all of the floral parts are transformed into green leaflike structures (Fig. 1), and little or no seed is produced. These symptoms correspond to those described for phyllody of sesame in India (9).

Leaves were collected from sesame plants which exhibited symptoms of phyllody and from healthy plants without symptoms growing in fields at the Northeast Agricultural Center, Khon Kaen. Twenty-five pieces each from healthy and infected leaves were cut in 1- X 3-mm sections with a razor blade. The leaf pieces were then placed in separate vials of 1% buffered osmium at 2 to 4 C for 2 hr. The tissue was dehydrated in a graded series of ethyl alcohol and sent to M. K. Corbett (Botany Department, University of Maryland), where they were embedded in a mixture of Cardolite Maraglas plastic, sectioned with a Porter-Blum MT-1 ultramicrotome, stained with lead citrate and uranyl acetate, and examined with a Hitachi model HU-11C-1 electron microscope. Figure 2 is an electron micrograph of an ultrathin section of phyllody sesame phloem tissue showing the presence of pleomorphic membrane-bounded bodies similar to those reported for mycoplasmae (2, 5). Similar bodies were not found in the healthy tissue. No virus particles were observed in either diseased or healthy tissue.

On this basis it is assumed that the causal agent of the phyllody disease of sesame is mycoplasma-like in nature and not a virus as reported earlier (9).

LITERATURE CITED

1. DIVISION OF AGRICULTURAL ECONOMICS. 1967. Agricultural Statistics of Thailand. Office of the Under-Secretary of State, Ministry of Agriculture, Bangkok, Thailand. 194 p.
2. DOI, Y., M. TERANAKA, K. YORA, & H. ASUYAMA. 1967. Mycoplasma-or PLT group-like microorganisms found in the phloem elements of plants infected with mulberry dwarf, potato witches' broom, aster yellows or paulownia witches' broom. *Ann. Phytopathol. Soc. Japan.* 33:259-266.
3. KASHI, R. 1930. Studies on Indian oilseeds (1). The types of *Sesamum indicum* DC. *Mem. Dep. Agr. Bot. Ser.* 18:144.
4. KULTHONGKHAM, S. 1948. Sesame growing at Sukho-Thai. *Kasikorn* 5:318-321.
5. MARAMOROSCH, K., E. SHIKATA, & R. R. GRANADOS. 1968. Structures resembling mycoplasma in diseased plants and in insect vectors. *Trans. N.Y. Acad. Sci.* 30:841-855.
6. PAL, B. P., & PUSHKAR NATH. 1935. Phyllody: a possible virus disease of sesame. *Indian J. Agr. Sci.* 5:517-522.
7. RHIND, D., F. D. ODELL, & U. T. SU. 1937. Observations on phyllody of sesame in Burma. *Indian J. Agr. Sci.* 7:823-840.
8. ROBERTSON, H. F. 1928. Annual report of the mycologist, Burma, for the year ended 30 June 1928 (Page 5).
9. VASUDEVA, R. S., & H. S. SAHAMBI. 1959. Phyllody in sesame (*Sesamum orientale* L.) *Indian Phytopathol.* 8:124-129.