TARC Note

Phyllody Disease of Some Legumes in Thailand

I. Mycoplasma-like organisms associated with phyllody of peanut, soybean, mungbean and winged bean

As a result of observations carried out from 1976 to 1982, the phyllody disease of peanut, soybean, mungbean and winged bean was detected in Sukothai, Nakhonsawan, Khon Kaen and Prachuap-Khirikhan provinces. Later, the disease was found to occur in other provinces too, such as Phitsanulok and Kamphaeng-Phet in a mild form and with a limited distribution.

The infected plants showed typical symptoms of phyllody: flowers changed into leafy structures, a proliferation of axillary buds in branches, and small and stunted leaves (Plate 1). These symptoms are characteristic ones induced by mycoplasma-like organisms on plants.[2,5,6,7,8]

This report deals with the electromicroscopic observation of lesions of the diseased legumes.

Leaves and flowers of infected or normal plants of 4 species, peanut (*Arachis hypogea* Linn.), soybean (*Glycine max* (Linn.) Merr.), mungbean (*Phaseolus aureus*), and winged bean (*Psophocorpus tetragonolobus*), were cut into small pieces and fixed in 4% glutaraldehyde for 3–4 days at the temperature of 4°C. The pieces were washed with 0.01 M phosphate buffer solution of pH 7.2, post-fixed with 2% OsO_4 for 3 hr and washed again with the buffer.

After dehydrated by using an ethanol series (25, 50, 75, 90, 95 and 100%), the pieces were infiltrated with 50, 75 and 100% "Spurr's" resin and embedded in "Spurr's" resin at 70°C for 8 hr. The fixed pieces were sectioned with a SORVALL MT 2–13 ultramicrotome with glass knives to a thickness of about 60–90 nm, and double-stained in 2% aqueous uranyl acetate and lead citrate.[3,4,11] The sections were observed under an electromicroscope (Hitachi H-300).

A large number of bodies of mycoplasma-like organisms, showing spherical to pleomorphic ones, ranging from 80–800 nm in diameter, were detected in phloem cells of 4 kinds of plants infected with phyllody disease (Plate 2). The bodies contained ribosomes and electrontransparent zones which were traversed by fine filaments and enclosed by a unit membrane. No such bodies were detected in tissues from healthy plants.

The result of the ultrastructural study on mycoplasma-like organisms associated with the phyllody disease of peanut, soybean, mungbean and winged bean is preliminary. Natural distribution of the phyllody disease of plants has been reported by some researchers. The disease is tarnsmitted by leaf hoppers.[5,9,10] However, there is no report on relationships among the causal organism of the disease, the leguminous plants and vectors in Thailand. Further studies should be carried out to identify the specific vectors, the relationship between host plants and vectors, and the effect of chemotherapy including the use of tetracycline antibiotics on the infected plants.[1]

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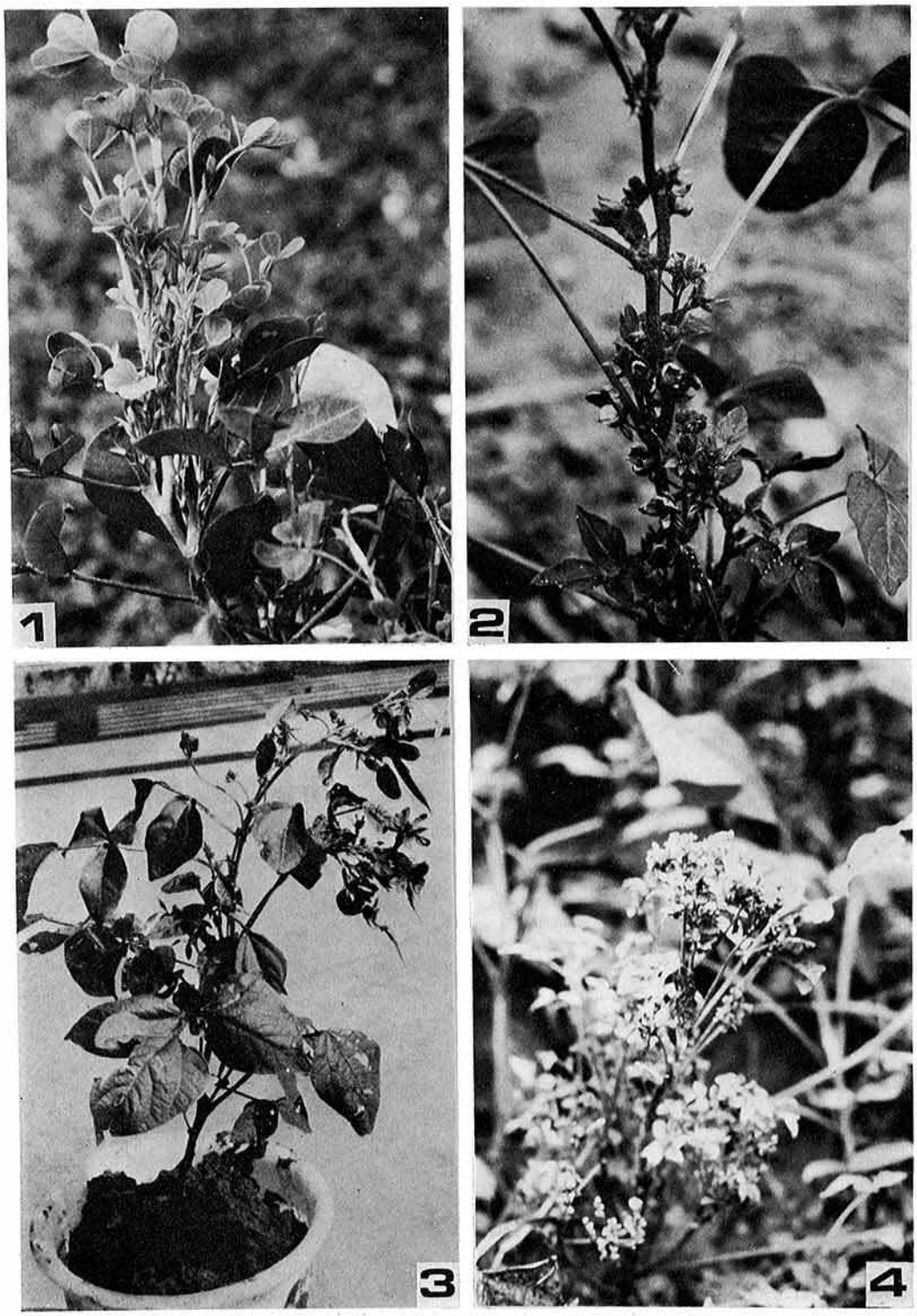

Plate 1. Symptom of phyllody disease
1: Peanut, 2: Soybean, 3: Mungbean, 4: Winged bean

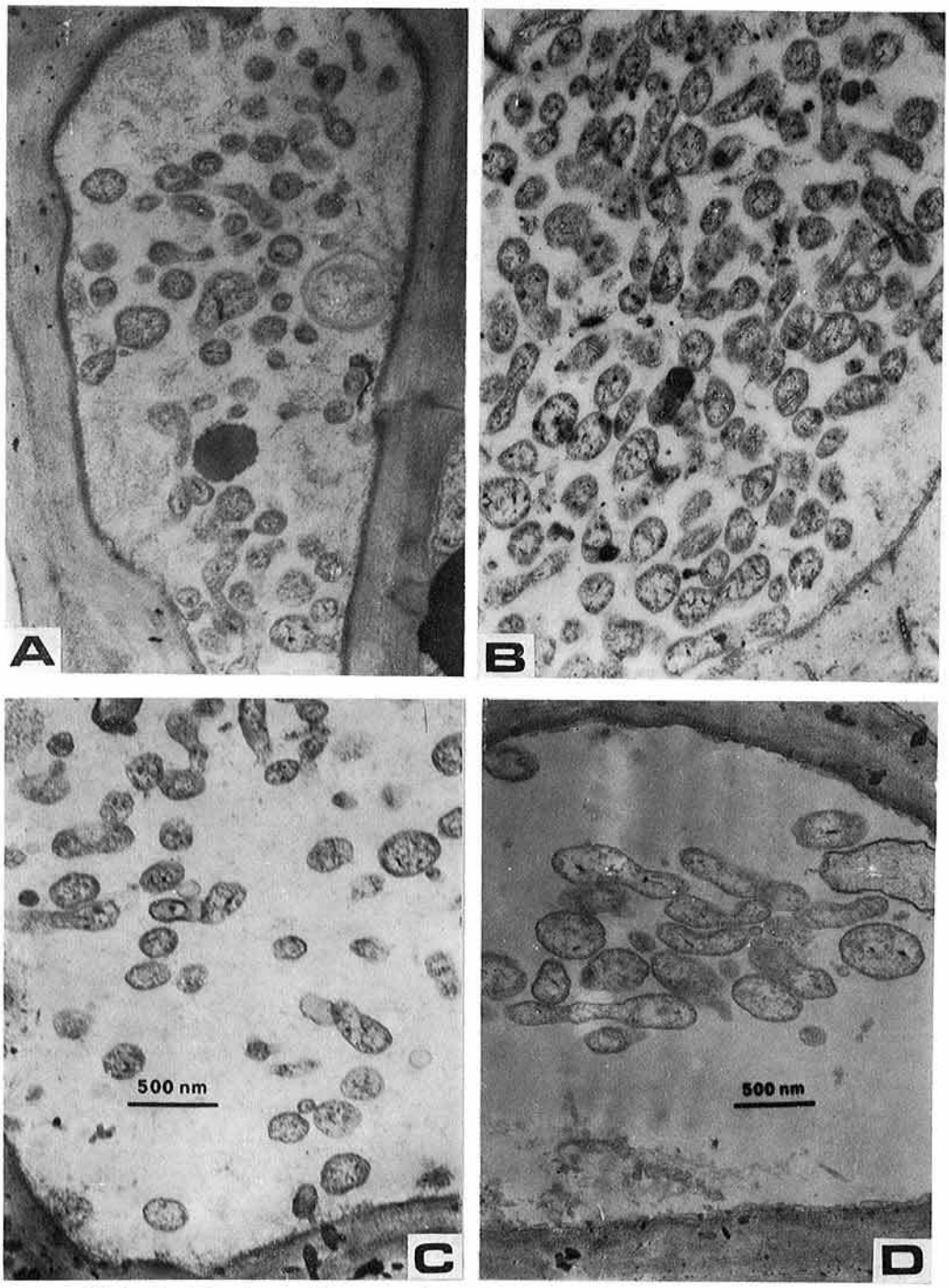

Plate 2. Micoplasma-like organisms detected in phloem cells of plants infected with phyllody disease
A: Peanut, B: Soybean, C: Mungbean, D: Winged bean

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