

## The First Report of a Tymovirus Infecting Groundnut (*Arachis hypogaea*) in India

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In 2006, a disease characterized by mosaic mottle and yellowing symptoms was observed on groundnut (*Arachis hypogaea* L.) at Patancheru, Andhra Pradesh, India. Severe symptoms were restricted to a few leaves (Fig. 1a), which were subsequently masked with the plant growth. The disease was readily transmitted by mechanical sap inoculation from plant to plant in groundnut and several host species in the families, Fabaceae, Chenopodiaceae and Solanaceae. A virus was purified from the infected groundnut plants. Purified particle preparations revealed isometric particles of ~28 nm in diameter (Fig. 1b), two polypeptides of molecular weight 25 kDa and 22 kDa, and a single-stranded RNA species of 7000 nucleotides that was infectious. In some preparations, a second RNA of 6200 nucleotides was observed which appeared to be less than the full-length piece of genomic RNA, as various cDNA clones in Northern hybridizations reacted with both of the RNA species. Viral genome was cloned and sequenced.

Preliminary comparisons of sequence with those in the GeneBank database indicated homologies (80-94%) with several species in the family *Tymoviridae*, particularly with *Kennedya yellow mosaic virus* (KYMV; genus, *Tymovirus*) isolated from *Keenedya rubicunda* (Fabaceae) from Australia (Ding et al 1990), with which the virus isolated from groundnut shared about 94% sequence homology in the coat protein region. Further virus characterization may reveal whether it is an isolate of KYMV or a novel species in the genus *Tymovirus*. Inoculation of purified virus particle preparations onto groundnut has resulted in disease symptoms, suggesting that it was the causal pathogen. Polyclonal antibodies were produced against the purified virus particle preparations in a rabbit. Search for natural occurrence of the virus by enzyme-linked immunosorbent assay (Kumar and Waliyar 2007) using these polyclonal antibodies detected the virus in

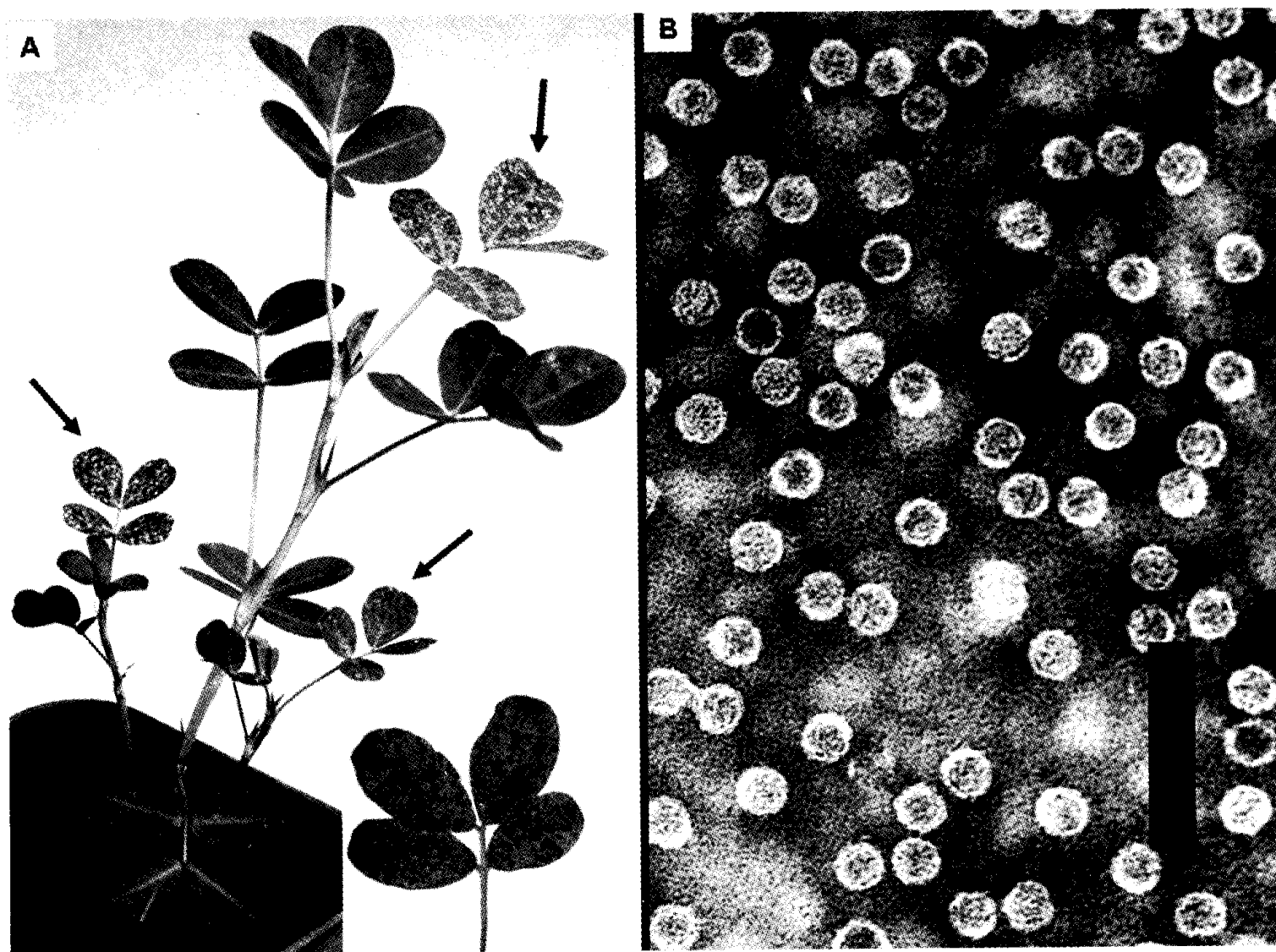
*Stylosanthes guianensis* (Fabaceae), a forage legume widely grown in the Patancheru fields.

Verification of past survey records at ICRISAT included the description of a similar disease in groundnut fields at Raichur (Raichur District, Karnataka) and Aliyarnagar (Coimbatore District, Tamil Nadu), India, in 1991, but the virus identity was not established (Reddy et al 1993). By comparative biochemical characterization using the lyophilized infected tissue stored in 1991, we have determined that the disease observed in groundnut in 1991 and 2006 is caused by the same tymovirus.

The only tymovirus reported on groundnut is peanut yellow mottle virus (=Peanut yellow mosaic virus, PeYMV) from Nigeria (Lana 1980; Sreenivasulu et al 2006). But, PeYMV and the tymovirus isolated in India differ in the host range, although serological comparisons have not been done. To our knowledge, this is the first report of the identification of a tymovirus in groundnut in India. We need to elucidate the extent of virus spread, frequency of occurrence, mode of transmission and natural host range for this tymovirus.

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**Figure 1.** Groundnut (cv. JL24) showing symptoms of the tymovirus infection (left). Severe mosaic mottle symptoms (arrows) were restricted to only a few leaves and the rest showed mild mottle symptoms. Inset. Leaf symptoms. Electron micrograph of a purified particle preparation stained with 1% uranyl acetate, pH 3.5 (right). Bar = 100 nm.

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