

parison with that of *S. terebrans* and *C. fluviatilis* exhibits an intermediate condition between *C. fluviatilis* and *S. terebrans*.

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TOMATO SPOTTED WILT VIRUS (TSWV)—A NEW RECORD ON CHILLI IN INDIA

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CHILLI (*Capsicum annum* L), an important crop grown for its fruits is susceptible to the mosaic disease^{1, 2}. During the survey of chilli mosaic disease in Karnataka in 1978–79, some of the isolates of chilli mosaic from the fields showed different symptoms on *C. annum* cvs California Wonder and Byadgi Kaddi. The cultures of such isolates were maintained on the above hosts. All the isolates maintained on *C. annum* behaved alike. Since the symptoms were entirely different from the earlier reported chilli mosaic diseases in India, investigations were undertaken to identify the causal agent of this disease.

For mechanical transmission, diseased leaves of California Wonder were macerated in sterilized mortar and pestle using 1 ml phosphate buffer (0.067 M, pH 7). The resultant pulp was squeezed through the muslin cloth and test plants were inoculated with this sap as standard inoculum by conventional leaf rub method. Celite (600 mesh) was used as an abrasive. For aphid transmission, about 25 non-viruliferous, apterous

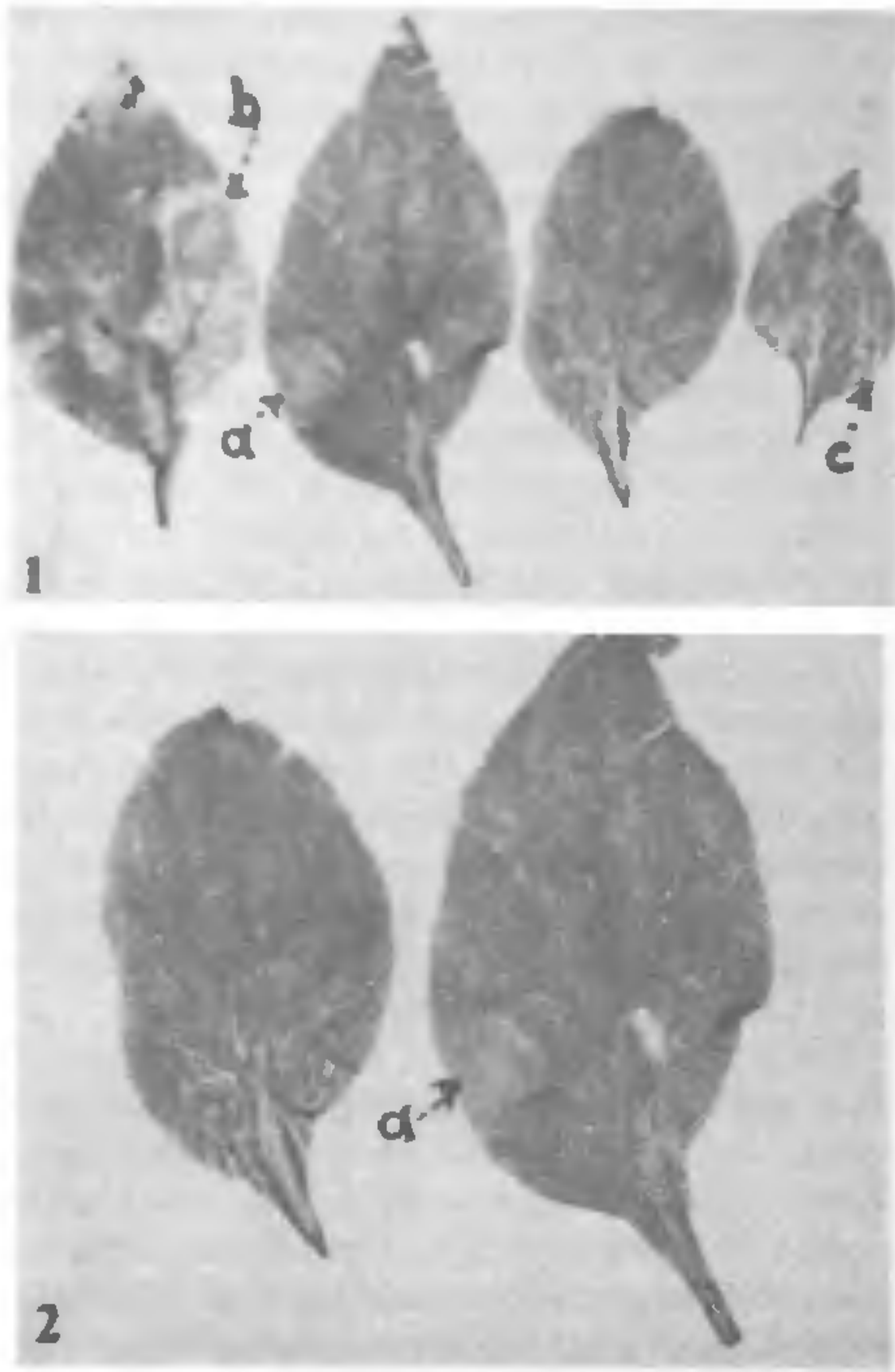
forms of *Myzus persicae* Sulz., *Aphis gossypii* Glov., *A. craccivora* Koch., *Rhopalosiphum maidis* Fitch and *Hysteroneura setariae* Thomsos were fasted for 90 min and given an acquisition feeding of 20 min on virus infected leaves before they were transferred to test plants for inoculation feeding of 24 hr. For thrips transmission about 25 nonviruliferous, both adults and nymphs of *Thrips tabaci* Lind (tobacco source); *T. tabaci* (onion source) and *Scirtothrips dorsalis* Hood (chilli source), were allowed for acquisition feeding for 5 days on the virus-infected leaves and inoculation feeding of 10 days on healthy young leaves. The insects were finally killed by spraying with 0.02% dimethoate insecticide.

The virus was readily transmitted by sap inoculation; however, the per cent transmission of this virus was limited, i.e. only 10–20% plants infected. None of the aphids used here transmitted this virus. Only the nymphs of *T. tabaci* isolated and maintained on onion plants transmitted to *C. annum* cvs California Wonder and Byadgi Kaddi and not by *S. dorsalis* as reported on groundnut³. It was not seed-borne.

This virus first produced pin head necrotic spots on inoculated leaves. After 10–12 days of inoculation, young leaves showed chlorotic mottling with dense coalesced small rings and spots. One month after inoculation, the plants showed on older leaves small rings and concentric rings inside (figure 1a). The bright yellow chlorotic rings later became necrotic (figure 1b). Subsequent young leaves became small with chlorotic line patterns. Fruits also showed the same concentric rings.

Physical properties of the virus were studied by following the method of Noordam⁴. The virus had dilution end point between 1:500 and 1:1000, thermal inactivation point between 40 and 50°C and longevity *in vitro* of 2 hr at 21–26°C. The above characteristics clearly differentiate the causal virus from all other viruses reported on chilli in India^{5–8}. The present virus resembles, however, TSWV in symptom production^{3, 9, 10} sap transmission and insect transmission^{11, 12}, seed transmission¹³ and physical properties in crude extract^{3, 14}.

In Ouchterlony test, the present virus did not show any reaction with antisera of 11 viruses reported on chilli indicating lack of any serological relationship with these viruses. However, *Lycopersicon esculentus* var Pusa Ruby first showed necrotic irregular brown spots and later plant produced bronze coloured leaves after 20 days of inoculation. Tomato fruits produced were round with chlorotic concentric rings on their surface. Some commercial chilli cultivars in Karnataka



Figures 1 & 2. Symptoms of TSWV on the leaves of *Capsicum annuum* L cv California Wonder 1a. Older leaf showing bright yellow concentric rings inside the spot. **b.** The bright yellow chlorotic rings became later necrotic. **c.** Chlorotic line patterns on young leaf. **2.** Enlarged central two leaves of figure 1.

in the farmers fields, although showed infection by TSWV, their reaction to the virus under artificial conditions is yet to be ascertained.

Therefore, based on the host reaction, physical properties and virus-vector relationships, the present virus isolate has been confirmed as a strain of TSWV in Karnataka. Its natural occurrence on new host *Capsicum* spp. has not been reported earlier in India.

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A NEW DOWNY MILDEW OF *HETEROPOGON CONTORTUS*-THREAT TO MAIZE CROP

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HETEROPOGON CONTORTUS (L.) Beauv. ex Roem. and Schult., a perennial grass, is found distributed in the plains and upper ghats of Peninsular India and is widely spread in almost all parts of Karnataka. Recently, a downy mildew has been observed on this grass at the Manasagangotri campus of the University of Mysore. The disease appeared in May, 1983, and spread to other plants until November, 1983. The Monsoon rains and congenial temperature promoted the spread of the pathogen.

The fungus produced both the asexual and sexual stages (figures 2, 4). The infected plants showed characteristic acicular leaves (figure 1) and in late