SHORT COMMUNICATIONS

Chilli little leaf - a new phytoplasma disease in India

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Chilli (Capsicum annuum L.) is one of the most important vegetable crops in India. This crop is prone to several viral diseases (6). During the year 1996-97 a disease causing little leaf symptom in few chilli plants cv. Pusa Jwala was observed around Varanasi. Other symptoms include malformation and proliferation of axillary buds. Infected plants had many abnormally filiformed little leaves which failed to attain full size. The flower buds took upright position instead of being pendulous. Simultaneously or little later the normally dormant axillary buds sprouted. As the disease progressed all the freshly produced flowers became phylloid and leaves became progressively smaller. The stimulated axillary buds grew out into axillary shoots which in turn produced secondary and tertiary axillary branches with short internodes. Later on the diseased plant gave a rosette appearance (Fig.1). Stunting of the plant was of common occurrence after infection. Infected plants did not bear fruits and loss in yield in case of early infection was 100 per cent. The incidence of the disease was 5 per cent.

The disease was transmitted by grafting from chilli to chilli. Out of 10 chilli plants grafted, only six survived and exhibited typical little leaf symptoms 20-25 days after grafting. Experimentally the disease was neither transmitted mechanically nor by aphids or whiteflies.

For ultratomy and electron microscopy, the midvein of the freshly infected leaves were cut into 1.5 cm bits and fixed in 2% gluteraldehyde (in sodium cacodylate buffer) for 3 hr. After washing with 0.1 M phosphate buffer (pH 7.2) 4 times for 15 min each, the tissues were post fixed in 2% Osmium tetroxide. After washing in phosphate buffer, the tissues were dehydrated in acetone series and embedded in spurr’s medium (7). Ultrathin sections cut across the phloem elements were placed on copper grids, stained with 2% uranyl acetate followed by lead citrate and examined under a JEOL 100S.

Abundant phytoplasmas were seen in the phloem elements of the infected leaves (Fig.2). They were found in high concentration only in mature sieve tubes and not in phloem parenchyma. No such organisms were seen in similarly treated healthy leaves. Only spherical bodies were detected and they varied from 200-750 nm in size. Only very few elementary bodies of about 140 nm were found. The most common forms were represented by large spherical bodies of about 475-700 nm with a central nuclear area containing DNA-like fibrils and ribosome like particles in the cytoplasmic area. Very few budding cells and also few
Fig. 2. Electron micrograph of the thin section of the phloem cells showing phytoplasma bodies
SPI = Sieve Plate; SP = Sieve Pore

bodies undergoing duplication were seen. Phytoplasmas moving from one cell to another cell through sieve pores were also observed. The infected plants when treated with 500 ppm oxytetracycline hydrochloride solution as soil drench and 200 ppm as foliar spray, showed spontaneous recovery, 25-30 days after the antibiotic treatment.

Based on the above results, it was concluded that the little leaf disease of chilli may be due to phytoplasma. This is the first record of a phytoplasma disease in chilli in India.

A number of diseases of vegetable crops have been found to be caused by phytoplasmas (6). Since 1967 when MLOs (now phytoplasma) were first described (1) as being associated with yellows diseases, there has been a number of reports on this subject. Phytoplasmas have also been detected in some solanaceous vegetables infected with little leaf, phyllody, marginal flavesence and witches’ broom in India eg. brinjal little leaf (8), bottlegourd phyllody (3), cucurbit phyllody (2), tomato big bud (5), tomato marginal flavesence (4).

REFERENCES


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