TOMATO SPOTTED WILT VIRUS ON PEANUT IN SENEGAL

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Tomato Spotted Wilt virus is thought to cause peanut diseases in many countries throughout the world. A specific characteristic of this virus is the wide range of symptoms which can be found on a single host, depending on factors such as age, mineral nutrition, surrounding environmental conditions, etc.

It is also known that this virus has several strains, each with different biological properties, and it is possible, according to BEST, that their genomes may recombine to produce varients.

In the literature shown on the next slide, at least 15 different symptoms found on peanut are described which are attributed to this virus :

- Ringspot disease
- Bud necrosis disease
- Stunting
- Small leaves
- Leaf distortion
- Mottling
- Shoot proliferation
- Chlorotic rings
- Mosaic
- General chlorosis
- Line patterns
- Leaves pinched inwards and rugose
- Necrotic spots
- Necrotic streaks on the stems
- Defoliation
- Internodes reduced in size
- Short axillary shoots
- Harsh, bunched appearance

On surveys in Senegal undertaken in 1983 and 1984, DUBERN was able to observe different viral type symptoms on peanut. Certain of them have been attributed to TSWV : necrotic spots, stunting, chlorotic spots and mosaic ringspots. The latter resemble the strokes of a brush and can be seen on the next slide. From the peanut leaflets shown here, a few rare particles were detected using thin section electron microscopy ; 80-90 nm in diameter, these are similar to the numerous particles described in literature as being TSWV. On the other hand, it has very seldom been possible to detect TSWV type particles using leaf dips and mechanical transmission has been unsuccessful, both from peanut to peanut and from peanut to test plant. TSWV symptoms are also observed on other vegetable crops grown off season in the same zones where peanut is affected. Here too, especially on the green bean and tomato, TSWV type particles can be detected using <u>in situ</u> electron microscopy.

Based on these data, and on the knowledge that <u>Thrips</u> are found on peanut, a programme was launched in 1985 to asses the impact of Tomato Spotted Wilt Virus as a possible limiting factor on peanut cultivation in Senegal. During the 1986 peanut season, observations were carried out in different parts of the country, as shown on the next slide. Several symptoms described in available literature were seen, notably ringspots and line patterns, which were sometimes found on the same plant (Ti 10 - 4 slides) : different kinds of mosaic with or without ringspots and with or without line patterns (K 63 - 2 slides), mosaic resembling the strokes of a brush (Ti 13 - 1 slide), chlorotic

ringspots (Ti 11 - 2 slides) chlorosis of small leaves (M 17 - 1 slide), marginal necrosis on young leaves (D 18 - 1 slide), stunting with short internodes and ruguse leaves (Nd 47 - 1 slide) and many other symptoms that could be induced by TSWV, at least according to available literature.

After insecticide treatment, these peanut plants were brought to the Montpellier laboratory, placed in an insect proof cage and examined with different methods :

- Leaf dip studies using electron microscopy
- Serology analyses using the ELISA technique with 2 antiserums from 2 different origins
- Analyses through mechanical transmission on Nicotiana rustica and on isolated Petunia hybrida leaves
- Analyses for several plants by grafting them onto healthy ones.

Part of this study can be seen on the next slide :

- Here are TSWV type symptoms.
- On leaf dips, a few rare spheric particles can sometimes be observed in the absence of all other flexuous or rod shaped viral particles (except for a few cases of peanut clump, either alone or in mixed contamination).

On the other hand, none of these samples responded positively to the 2 TSWV antiserums tested, and no conclusive recurring results were obtained through mechanical transmission, neither from peanut to peanut nor from peanut to test plant.

To date therefore, no TSWV Senegal peanut strains have been multiplied in the laboratory. Unfortunately, it is impossible to carry out Thrips transmission tests in Montpellier because of phytosanitary regulations and for the time being, no one has been able to tackle the problem in Senegal.

During the 1987 winter season, a survey was carried out in these same regions to try to identify a Senegal TSWV strain on vegetable crops and wild plants in peanut fields. Eighty-seven samples representing 12 different species (including 4 peanut plants found in a farmer's field) were serologically tested on site using the ELISA technique, with the antiserum provided by Dr GONSALVES. Twenty-two plants responded positively to naked eye colormetic readings. These plants were then brought to Montpellier and retested with 2 types of antiserum. Only 2 plants systematically gave positive tests, 2 Amaranthus, as can be seen in the table on the next slide.

Assay species tests on Petunia hybrida succeeded only twice, on another Amaranthus and one tomato plant, but their serological tests were negative in Montpellier.

To conclude, it appears that a wide range of symptoms are found on peanut in Senegal which are different that those already attributed to viruses in West Africa such as Eyespot virus, Crinkling virus, Clump virus, Chlorotic rosette virus or Chlorotic spotting virus. Several of these symptoms can be attributed to TSWV and some of the techniques used, leaf dips, thin sections and graft transmission give weight to this hypothesis. Nonetheless, it is possible that we are up against a strain with different biological properties which have to be defined in order to multiply it. Given that 5 to 10 % of peanut plants are affected in certain fields, this problem needs to be taken seriously and the means necessary to study it have to be found before the situation takes a turn for the worse.

In closing, we should like to add that the n°1 public enemy in Senegal today is Clump, which manifests itself through early infection, resulting in large spots on peanut, or through late infection, remaining, in this case, practically unnoticed. Because of the possibility of transmission through seed however, it always represents a permanent danger.

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