Some of the fields of an experimental farm situated in the Po Valley area (Ozzano, Bologna), utilized by the Department of Agronomy of the University of Bologna to assay different agronomic techniques were found to be severely infested by BaYMV and BaMMV. This provided us with an excellent opportunity to study the effects of different agronomic practices on BaYMV and BaMMV.

The tillage depths compared were 50 cm, 25 cm and 8–10 cm. Crop rotation schemes were continuous barley, wheat–barley, and beet–wheat–sunflower–barley. Plots (42 m^2) were distributed in the field according to a randomized block design with 3 replicates. Each barley plot was divided into 2 parts, sown with either cv Plaisants (susceptible to both viruses) or cv Express (resistant). During the last 3 years we rated symptom severity and collected 10/20 plants per plot (mid-March) following a random sampling pattern. Leaf samples were tested by immunosorbent electron microscopy (ISEM) and/or double antibody sandwich enzyme linked immunosorbent assay (DAS-ELISA). Neither BaYMV nor BaMMV were identified in the resistant barley cv Express. The effects of virus infection on grain yield were estimated by comparing the performance of the 2 barley cvs within each plot. Symptom severity and development varied each year.

Symptom severity ratings, serological readings and yield loss estimates were positively correlated. Virus infection was higher in plots where barley had been grown continuously, slightly lower in those where barley was alternated wheat, and consistently lower in those where barley was grown every 4 years. The effects of the different soil tillage practices on virus infection were less clear.

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Studies on the various factors influencing the occurrence of wheat mosaic diseases with an emphasis on the vector *Polymyxa graminis*.

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Soil-borne wheat mosaic virus (SBWMV) and wheat yellow mosaic virus (WYMV), both transmitted by *Polymyxa graminis* a plasmodiophoromycete fungus, cause mosaic symptoms in wheat. Based on studies on barley (Adams *et al*, 1986; Bastin and Maraite, 1989), a bait plant technique has been standardised in France (INRA de Versailles/SRPV) to assess the soil infectivity by *P graminis* (unpublished data).

In 1994, experiments were carried out in France to evaluate this technique. Infestation levels of *P graminis* in the soil were assessed throughout the year in a wheat field naturally infested with both SBWMV and WYMV (Chambon/Cisse (Loir-et-Cher)). A quantitative assessment of the soil infectivity was also made for soils collected from the 'uninfested' and the 'diseased' plots of this field.

Another study was carried out in collaboration with Coopérative Franciade on soil collected from a field infested by SBWMV (Pontlevoy, 41), in order to assess the influence of a long-term cultivation (8 years) of susceptible and tolerant wheat cultivars on the soil infectivity.

In the field of Chambon-Cisse, a decrease of maximum 20% in soil infectivity followed by an increase of 50% at the end of one crop rotation (release of cystosori from roots into the soil) were observed during the year.

The calculated soil infectivity by *P graminis* was 4 times larger in the diseased plot than in the 'uninfested' one, in which no symptoms were observed over several years.

No significant differences between the infestation levels of *P graminis* in soil were observed for the 2 treatments in the field at Pontlevoy. However, the number of positive plants tested for SBWMV by ELISA was higher for the plots where a susceptible cultivar was grown continuously (10/20 plants) than for those where a tolerant cultivar was multiplied (3/20 plants). Tolerant cultivars may reduce the virus multiplication and lead to an increase of virus-free population of *P graminis*. The experiments should be pursued further to confirm these preliminary observations.

The bait plant technique standardised in France allowed the assessment of soil infectivity by *P graminis* vector of SBWMV and WYMV. Procedures to overcome the erratic germination of the cystosori of this fungus need to be developed. The working group (Université Catholique de Louvain, Rothamsted, SPRV) suggested techniques to render the wall of the resting spores fragile by treatments with KOH, chitinase, *etc.*

Thanks are due to M Fouchard (INRA, Versailles) for his collaboration.

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Severe stunting of wheat caused by the Indian peanut clump virus (IPCV), possibly vectored by *Polymyxa* sp. P Delfosse [1], A Legrève [2], AS Reddy 1, B Vanpee [2], AK Murthy [1], DVR Reddy [1], H Maraite [2] *([1] International Crops Research Institute for the Semi-Arid Tropics, ICRISAT Asia Center, Crop Protection Division, Patancheru PO, 502 324 Andhra Pradesh, India; [2] Université catholique de Louvain, unité de phytopathologie, faculté des sciences agronomiques, place Croix-du-Sud 2, Bte 3, B-1348 Louvain-la-Neuve, Belgium)*

The peanut clump virus is a furovirus affecting groundnut in West Africa (WAPCV) and in India (IPCV). In India the virus is seedborne in *Arachis hypogaea*, *Eleusine coracana*, *Pennisetum glaucum* and *Setaria italica*. *Polymyxa* sp a soil-inhabiting fungus transmits the virus to groundnut but also to various other crops and weeds. Up to now the monocots were found infected by the virus without showing any overt symptoms. From surveys conducted in the states of Punjab and Rajasthan in India, it is apparent that the most common rotation being used in the areas where the IPCV disease is very important is wheat in post-rainy season under irrigation and rainfed groundnut in rainy season. To simulate the conditions existing in farmers' fields, wheat (*Triticum aestivum*, cv Sonalika) was grown in fields infested with the Hyderabad isolate of IPCV (HIPCV) on ICRISAT Asia Center farm. Wheat seeds treated with Thiram at 3 g/kg were sown on 25 November 1994 at a rate of 45 kg/ha. Diammonium phosphate was applied before sowing (100 kg/ha). Top dressing was given with urea (25 units of nitrogen per ha), 2 weeks after emergence. Irrigation was given twice a week to favour the infection by *Polymyxa* sp. The virus was detected by the penicillinase-based form of DAS-ELISA and immunosorbent electron-microscopy with a polyclonal antiserum raised against HIPCV isolated from groundnut.

Two weeks after planting 5 plants without any overt symptoms showed the presence of the virus. One month after planting a number of plants were infected by the virus and showed a severe stunting with old leaves darker in colour than those of uninfected plants. The diseased plants were not only present in the known infested patches observed for groundnut crops over several years but were also scattered all over the field in areas where usually very few infected groundnut plants were observed in rainy season. As the crop aged, many of the infected plants died. The surviving plants remained severely stunted with dark green leaves. The majority of these plants produced malformed ear heads often enclosed in the flag leaf. Excessive tillering was observed. The seeds were shrivelled and few in number. The seeds from infected plants were currently being tested for frequency of seed transmission, all contained the virus in their tissues but out of 15 seedlings tested none was infected. In glasshouse experiment HIPCV isolated from groundnut and multiplied on French bean was inoculated onto roots of wheat plants. The inoculated plants quickly showed a mild stunting, dark green leaves and yellow stripe symptoms as observed in the field. The typical veinal necrosis symptoms caused by IPCV were observed on French bean inoculated with infected wheat leaf extract. This result shows that infected wheat leaves can be used as a source of inoculum to transmit HIPCV by sap inoculation. *Polymyxa* sp cystosori were present in some roots of wheat naturally infected by HIPCV.

In the past wheat was shown to be a symptomless host for IPCV while grown on infested soil in controlled environment but it is evident from these results that the symptom expression can be determined by the environment or the genotype as for other furoviruses affecting cereals. The frequency of seed transmission of IPCV in wheat and the possible role of *Polymyxa* sp as the vector will be analysed.