Studies of UK isolates of barley yellow mosaic virus. N Shi [1], MJ Adams [2], JF Antoniw [2], J Chen [1], SA MacFarlane [1], TMA Wilson [1] *([1] Department of Virology, Scottish Crop Research Institute, Dundee DD2 5DA; [2] Plant Pathology Department, IACR-Rothamsted, Harpenden, Herts AL5 2JQ, UK)*

Three isolates of barley yellow mosaic virus (BaYMV) from different sites in the UK, 2 that were virulent on resistant European winter barley cultivars (resistance-breaking strain: BaYMV-2) and 1 that was not, were selected for study. In an attempt to detect consistent differences and thus develop a diagnostic test to distinguish the strains, the isolates were examined by RT-PCR, restriction mapping of RNA2 and sequencing of selected parts of the virus genome.

Restriction mapping of RNA2 cDNA showed no consistent strain-related difference. Nucleotide and predicted amino acid sequences were determined for the coat protein coding region on RNA1 and an area at the N-terminus of the 70 kDa protein coding region on RNA2. The sequences differed from those previously reported for a BaYMV isolate from Japan and for 2 German isolates, 1 of which was of the BaYMV-2 strain. There were, however, no strain-specific nucleotide or amino-acid differences that could be used to develop a rapid diagnostic test to distinguish BaYMV-2 from other isolates.

The results explain the earlier failure to develop monoclonal antibodies specific for the resistance-breaking strain. They also suggest that the differences previously reported between the 2 German isolates are probably not strain-related.

Reconnaissance du WYMV du WSSMV et du BaYMV par les anticorps monoclonaux dirigés contre l'isolat français du WYMV. D Hariri [1], T Delaunay [2], L Gomez [1], S Filleur [1], C Plovie [1], H Lapierre [1] *([1] INRA, unité de pathologie végétale, route de Saint-Cyr, F-78026 Versailles cedex; [2] INRA, unité de virologie et immunologie moléculaires, domaine de Vilvert, F-78352 Jouy-en-Josas cedex, France)*

Deux bymovirus proches ou identiques sont responsables de viroses chez le blé : le *wheat yellow mosaic virus* (WYMV) décrit au Japon et le *wheat spindle streak mosaic virus* (WSSMV) décrit au États-Unis. Ces virus sont composés de 2 particules flexueuses à RNA monocaténaire et ont une gamme d'hôte très restreinte. Les bymovirus du blé sont fortement reliés au *barley yellow mosaic virus* infectant l'orge, mais ces 2 virus n'ont pas d'hôtes communs. *Polymyxa graminis,* une plasmodiophorale, est l'unique espèce vectrice de tous les bymovirus connus.

En France les bymovirus du blé sont rencontrés dans des zones géographiques présentant des caractéristiques climatiques très différentes. L'objectif de cette étude est de déterminer leurs liens sérologiques avec le WSSMV et le WYMV.

Douze anticorps monoclonaux (MAbs), préparés à partir d'un isolat du WYMV (F) provenant de la région Centre en France, présentent des réactions très distinctes vis-à-vis des différents isolats de bymovirus du blé et de l'orge (BaYMV) d'origine variées.

En ELISA IDAS et ACP, les douze MAbs reconnaissent le WYMV(F) aussi bien sous forme de particules purifiées que dans un simple extrait foliaire de blé. L'analyse des isolats français, américains (WSSMV) et japonais, en ELISA IDAS et ACP par ces MAbs, montre une forte homologie entre les bymovirus du blé provenant des 3 continents.

Les pathotypes français du BaYMV (1 et 2) sont détectés uniquement en ELISA ACP avec quatre de ces MAbs. En ELISA IDAS et ACP les pathotypes japonais (I-1, I-2), anglais et belge du BaYMV présentent des réactivités différentes vis-à-vis des MAbs permettant de caractériser 4 types d'anticorps monoclonaux du WYMV.

L'analyse des différents isolats du bymovirus en ELISA IDAS et CAP montre qu'aucun des MAbs du WYMV testé n'est complètement spécifique de ce virus.

Inouye T (1969) *Nogaku Kenkyu* 53, 61-68

Slykhuis JT, Polak Z (1969) *Can Plant Dis Survey* 49, 108-111

Effects of soil tillage and crop rotation on BaYMV and BaMMV mixed infection. C Rubies-Autonell [1], G Toderi [2], A Marenghi [2], V Vallega [3] *([1] Ist di Patologia vegetale; [2] Dip di Agronomia, Via F Re 8, I40126 Bologna; [3] Ist Sperimentale per la Cerealicoltura, Via Cassia 176, I00191 Rome, Italy)*

Barley yellow mosaic virus (BaYMV) and barley mild mosaic virus (BaMMV) are widespread in northern Italy, where they cause severe crop losses (Grunchedi *et al,* 1992).

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.

Giunchedi L, Poggi Pollini C, Cattivelli L, Delogu G (1992) *Inf Agrario* 32, 51-54

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.*