through this gland, eventually arriving in the salivary duct from which they are excreted with the saliva during feeding of the aphid. Luteoviruses display a high degree of vector specificity at the various transmission barriers in the aphid. These well-developed specificities suggest an intimate association between a luteovirus and its vectors in which both surface domains of the viral capsid and sites or substances in the aphid are involved. The role of the viral capsid in conferring aphid transmissibility to a luteovirus has been convincingly demonstrated. Recently, aphid-derived components suggested to be involved in virus transmission were revealed by a protein blot-based virus overlay assay.

Adaptation and application of immuno-PCR method to study the interactions of aphids and barley yellow dwarf luteoviruses. JQ Guo [1], H Lapierre [2], JP Moreau [1] *([1] INRA, unité de zoologie; [2] INRA, unité de pathologie végétale, F-78026 Versailles cedex, France)*

The immuno-PCR method was adapted to amplify the French isolates of barley yellow dwarf, PAV, MAV and RPV luteoviruses in aphids. The sensitivity of this RT-PCR allowed for detection of 1 pg/ml of purified PAV virus preparation, and for a 128-fold dilution of a single viruliferous aphid *(Rhopalosiphum padi)*. Conventional PCR could detect such single aphids with only an 8-fold dilution, even though the virus accumulated to near 1 ng/aphid in a 5 d acquisition feeding on infected barley.

PAV virus was detected by immuno-PCR from the gut, salivary gland, hemolymph and legs, but not from the stylet and head of aphids of *R padi*.

PAV, MAV and RPV viruses were recovered by immuno-PCR in the hemolymph of virus-carrying *R padi*, *Sitobion avenae*, *Metopolophium dirhodum*, *Diuraphis noxia*, *Myzus persicae*, *Aphis fabae* and *A gossypii* after a 2-d inoculation feeding on healthy barley.

In a serial transfer test, *R padi* efficiently transmitted PAV and RPV, *S avenae* efficiently transmitted PAV and MAV until the last transfer at 13 d on barley. The Md-Nord clone of *M dirhodum* occasionally transmitted PAV and MAV, but not RPV, for up to 11 and 7 d transfers. Infrequent transmission of PAV was also found during the transfers of 7–11 d by *D noxia*, but not MAV and RPV.

Virus content (405 OD value) in a batch of 10 aphids of *D noxia* was much lower than that of *R padi*, *S avenae* and Md-Nord of *M dirhodum*. The decrease of virus content in the aphids was biphasic following the serial transfers. The initial decrease occurred rapidly after the first transfer. In the second phase, the decrease trend differed among the aphid species, but without being bound to virus transmission. Immuno-PCR could detect PAV, MAV and RPV viruses in the aphids of 4 species until the last transfer at 13 d, with the exceptions that for RPV in *D noxia* and in the Md-Nord clone it was only to 7 and 11 d transfers, and for MAV in *D noxia* to 11 d transfer.

Therefore, the aphid gut, as a barrier to the virion passage into the aphid's hemocoel, may not play a role of specific selection among these luteoviruses.

Intraspecific variations for transmission of BYDV-PAV and -MAV isolates by the aphids *Sitobion avenae* and *Rhopalosiphum padi*. E Sadeghi, CA Dedryver, S Tanguy, G Riault *(INRA, laboratoire de zoologie, domaine de la Motte, F-35650 Le Rheu; 65, route de Saint-Brieuc, F-35042 Rennes cedex, France)*

PAV transmission by S avenae

Fifty *Sitobion avenae* clones were collected in January 1990 in the area of Rennes on wheat, barley and oats, and tested for their ability to transmit a local isolate of BYDV-PAV (PAV4) to barley (cv Express). The acquisition and inoculation conditions were standardized: 20°C; L16/D8; 2 d acquisition; 5 d inoculation; 3 fourth instar larvae/test plant; 3 repetitions of 20 test plants/clone. Transmission percentages make a continuum from 3% for the worst transmitting clone to 92% for the best. There was however a non-negligable intraclonal variance. There was no non-transmitting clone but 5 clones were very bad vectors (less than 10% transmission). Deep green clones transmit significantly less than clones of other colors. Clones collected on wheat and oats transmit significantly less than clones collected on barley.

These results incited us to study the possible role of aphid stylet activities on interclonal variations of PAV transmission (Prado and Tjallingii, 1994). Two very different clones were compared by the technique of EPG (electropenetrography: Tjallingii, 1978): Sa5 (3% transmission) and Sa1 (50%) on barley and wheat. Preliminary results show that clone Sa5 feeds very badly on barley, with long non-feeding periods, few and short