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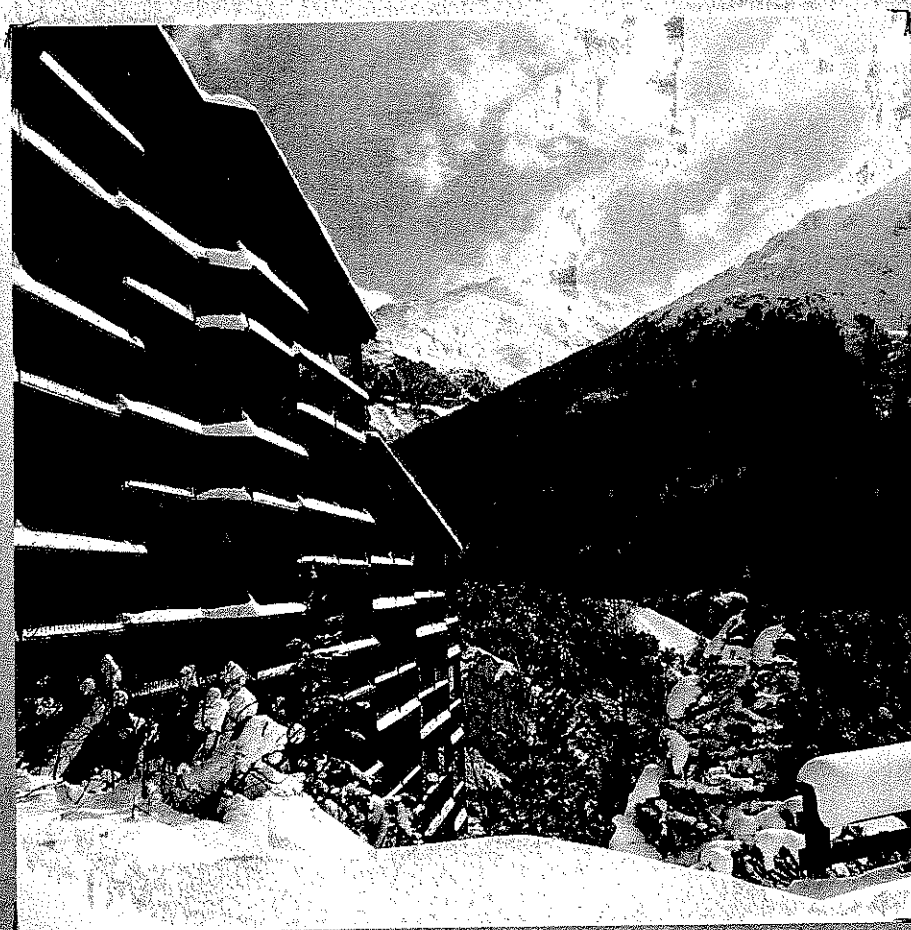
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**IVV**

# 13<sup>èmes</sup> rencontres de virologie végétale



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## Proteasome: a new antiviral defense pathway in plant?

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In plants, the ubiquitin/26S proteasome system (UPS) plays a central role in protein degradation and is involved in many steps of defence mechanisms, regardless of the kind of pathogens targeted (1). Besides its proteolytic activities, the UPS ribonuclease activity (RNase), previously detected in 20S proteasome preparations from cauliflower and sunflower (*Helianthus annuus*), was shown to specifically target plant viral RNAs *in vitro*. Here we show that recombinant *Arabidopsis thaliana* proteasomal alpha-5 subunit expressed in *Escherichia coli* harbours an RNase activity that degrades *Tobacco mosaic virus* (TMV, tobamovirus) and *Lettuce mosaic virus* (LMV, potyvirus) derived RNAs *in vitro*. Analysis of mutated forms of the alpha-5 subunit demonstrated that mutation of a glutamic acid at position 110 affects the RNase activity. Furthermore, we demonstrated using a bimolecular fluorescence complement assay, that the multifunctional helper component proteinase (HcPro) of LMV, already known to interfere with the 20S proteasome RNase activity *in vitro*, can interact *in vivo* with the recombinant alpha-5 subunit. Further experiments demonstrated that in LMV-infected lettuce cells, alpha-5 is partially relocalized to HcPro-containing infection-specific inclusions. Susceptibility analyses of *Arabidopsis* mutants knocked-out for each *At-PAE* genes encoding alpha-5, showed that one (*KO-pae1*) of the two mutants exhibit a significantly increased susceptibility to LMV infection (2). Taken together, these results extend to *A. thaliana* alpha-5 the range of HcPro-interacting proteasomal subunits, and suggest that HcPro may modulate its associated RNase activity that may contribute to an antiviral response

1. Dielen, A., S. Badaoui, T. Candresse, and S. German Retana. 2010. The ubiquitin/26S proteasome system in plant-pathogen interactions: a never-ending hide-and-seek game. *Molecular plant pathology* **11**:293-308.
2. Dielen, A. S., F. T. Sasaki, J. Walter, T. Michon, G. Ménard, G. Pagny, R. Krause-Sakate, I. Maia, S. Badaoui, O. Le Gall, T. Candresse, and S. German-Retana. 2010. The 20S proteasome alpha-5 subunit of *Arabidopsis thaliana* carries an RNase activity and interacts in planta with the Lettuce mosaic potyvirus HcPro protein. *Molecular Plant Pathology* **in press**.