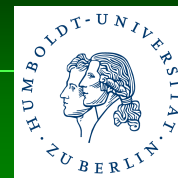


# Interaction of *Pepino mosaic virus* (PepMV) and *Piriformospora indica* with tomato hosts (*Lycopersicon esculentum* Mill.)



A. Fakhro<sup>1,2</sup>, D. Schwarz<sup>2</sup>, S. von Bargaen<sup>1</sup>, M. Bandte<sup>1</sup>, P. Franken<sup>2</sup>, C. Büttner<sup>1</sup>



<sup>1</sup> Humboldt-Universität zu Berlin, Landwirtschaftlich-Gärtnerische Fakultät, Department für Nutzpflanzen- und Tierwissenschaften,

Fachgebiet Phytomedizin, Königin-Luise Straße 19, D- 14195 Berlin, E-mail: [phytomedizin@agrar.hu-berlin.de](mailto:phytomedizin@agrar.hu-berlin.de)

<sup>2</sup> Institut für Gemüse- und Zierpflanzenbau Großbeeren/Erfurt e.V., Theodor-Echtermeyer Weg 1, D-14979 Großbeeren. E-mail: [igzev@igzev.de](mailto:igzev@igzev.de)

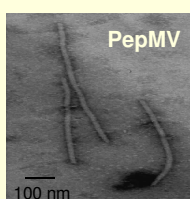
## Background

The viral pathogen *Pepino mosaic virus* (PepMV) has attracted much attention since it was found in tomato greenhouses worldwide and caused yield damage up to 90 %. The disease is difficult to control particularly because of the high contagiousness and possible damage. A disease management strategy could be the use of antagonistic microorganisms.

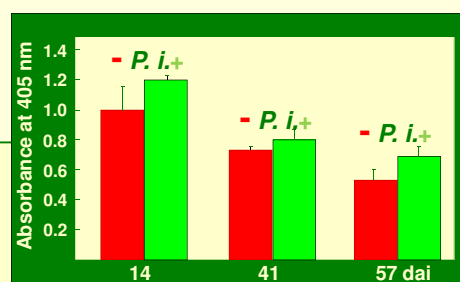
*Piriformospora indica* is a root endophytic fungus with plant-promoting properties in numerous plant species and induces resistance against root and shoot pathogens in many crops. Previous experiments indicated that the promoting effect of *P. indica* may depend on environmental conditions.

## Hypothesis

- The endophytic fungus *P. indica* is able to promote plant growth and reduce the incidence of pathogens, such as PepMV.
- Light level may lead to interactions between pathogenic and antagonistic microorganisms and thus different plant response.



## Low light conditions

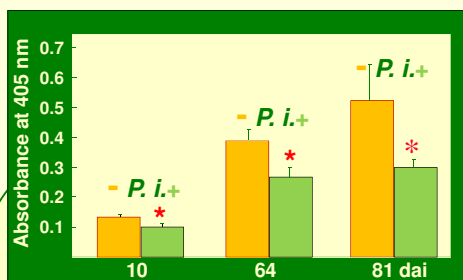


PepMV particle concentration decreased over time but was always >10% higher in plants additionally inoculated by the endophyte (*P. indica*).

PepMV concentration significantly increased in shaded tomato when inoculated by *P. indica*. However, the endophyte clearly decreased PepMV concentration of non shaded plants.

*P. indica* enhanced in each case fruit dry matter content and thus total dry matter production.

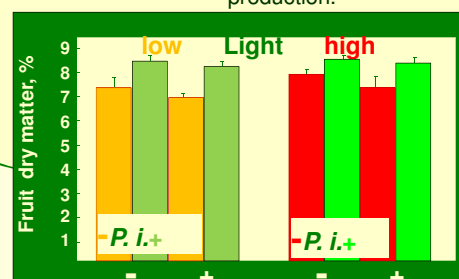
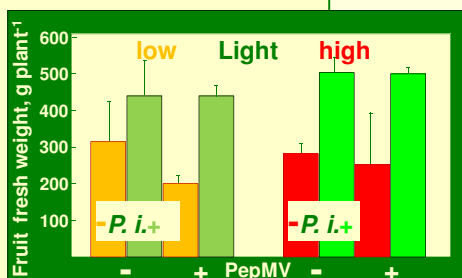
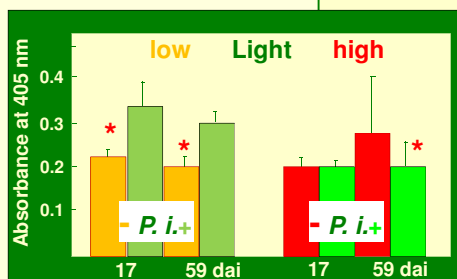
Factor	Treatment
Pathogen	PepMV infected
	E 397 not infected
EC, dS m <sup>-1</sup>	2 infected
	9 not infected
Light	Exp. 1. low 9 Mol m <sup>-2</sup> d <sup>-1</sup>
	Exp. 2. high 13 Mol m <sup>-2</sup> d <sup>-1</sup>
	Exp. 3 shaded 6 Mol m <sup>-2</sup> d <sup>-1</sup>
	non shaded 11 Mol m <sup>-2</sup> d <sup>-1</sup>



PepMV concentration increased over time but was reduced at additional endophyte (*P. indica*) inoculation.

PepMV infection decreased yield particularly at low light.

*P. indica* enhanced in each case the number of flowers and fruits. Thus, yield increased between 50 % to 100 % due to the higher fruit number.



## Conclusions

- ➔ Possible reasons for the induced resistance of *P. Indica* in tomato against PepMV are: antioxidant production, defense gene induction.
- ➔ Interference between pathogen and endophyte depends clearly on light conditions.
- ➔ Hypothesis of the growth promoting effect of *P. indica* are debated, such as better mineral nutrition, Phytohormones or even additional bacteria.
- ➔ Reasons for the better generative than vegetative growth and increase in dry matter content after inoculation with *P. indica* must be tested in the future.

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