

DIVERSITY OF PECTOBACTERIUM AND DICEYA SPECIES IN SAMPLES COLLECTED FROM FRENCH SEED POTATO FIELDS

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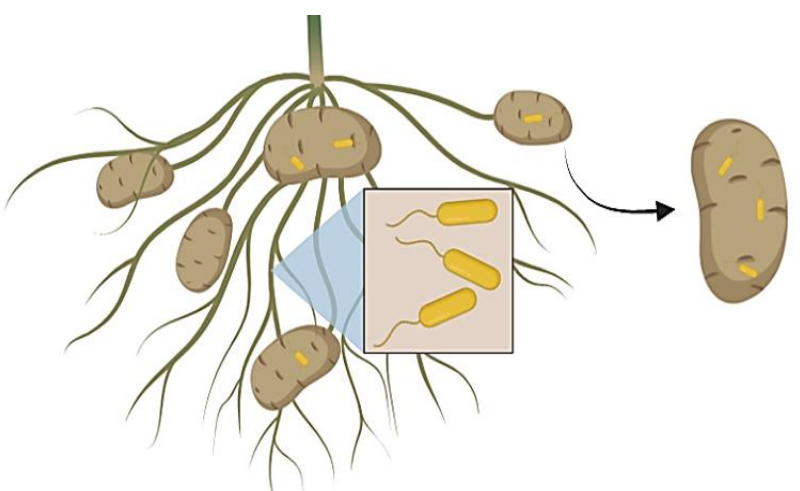
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The Blackleg disease

- Symptoms of leaf wilt and blackleg on stem ; soft rot on tuber
- Development favored by heavy rains and heat peaks
- **Acquisition** of bacteria by transmission from mother tuber to progeny tubers or by environmental contamination



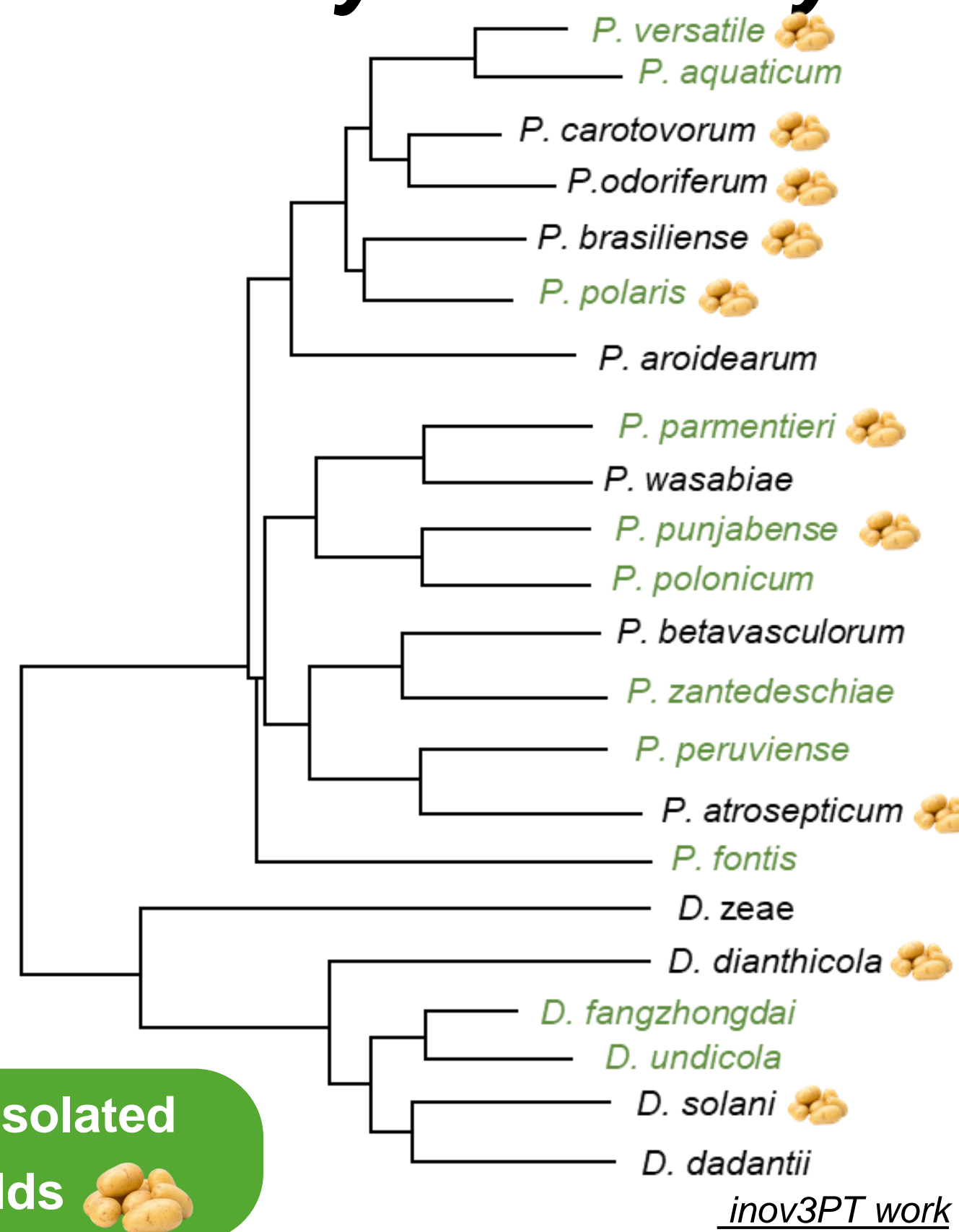
Latent infection : possible presence at low levels

- No protection solution available
- **Prophylaxis** and the use of **certified seed potatoes** reduce the risk of disease expression
- **1st or 2nd cause** of downgrading or rejection of seed potatoes (around 1% area / year ^a)
→ 1-2 million euros loss / year in France



Pectobacterium and Dickeya diversity

- Caused by **pectinolytic bacteria** belonging to the *Pectobacterium* and *Dickeya* genera
- **More than 33 species** of *Pectobacterium* and *Dickeya*
- Wide range of hosts
- Since 2016, **11 new species** described
- High genetic and phenotypic diversity
→ **Very different species behaviors**



10 species of *Pectobacterium* and *Dickeya* isolated from symptoms collected in French fields

Project objective and methodology

- To **monitor the evolution** of the different species of *Pectobacterium* and *Dickeya*, including potential emergence of new groups

Since 2003, annual survey targeted at symptomatic samples from the field



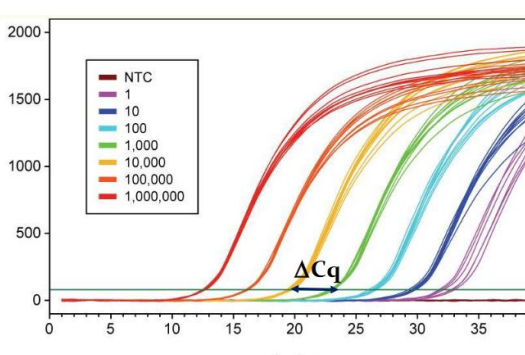
Symptoms sampling

Direct detection

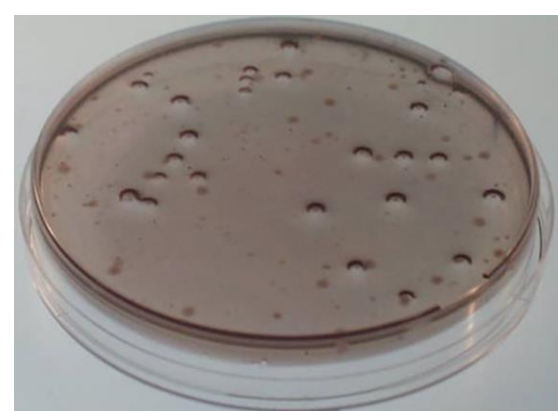
Isolation of pectinolytic bacteria



DNA Extraction and qPCR analysis



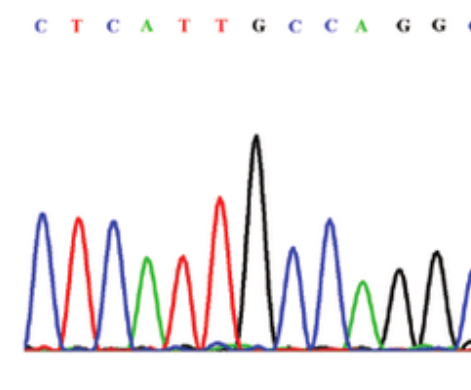
Contamination and diversification estimation



Selective media (Crystal Violet Pectate)



Isolates purification



Molecular identification

Results

- More than **1700 French fields** sampled since 2003 (around 100 fields / year)
- **No visual difference** in blackleg symptoms regardless of the species involved

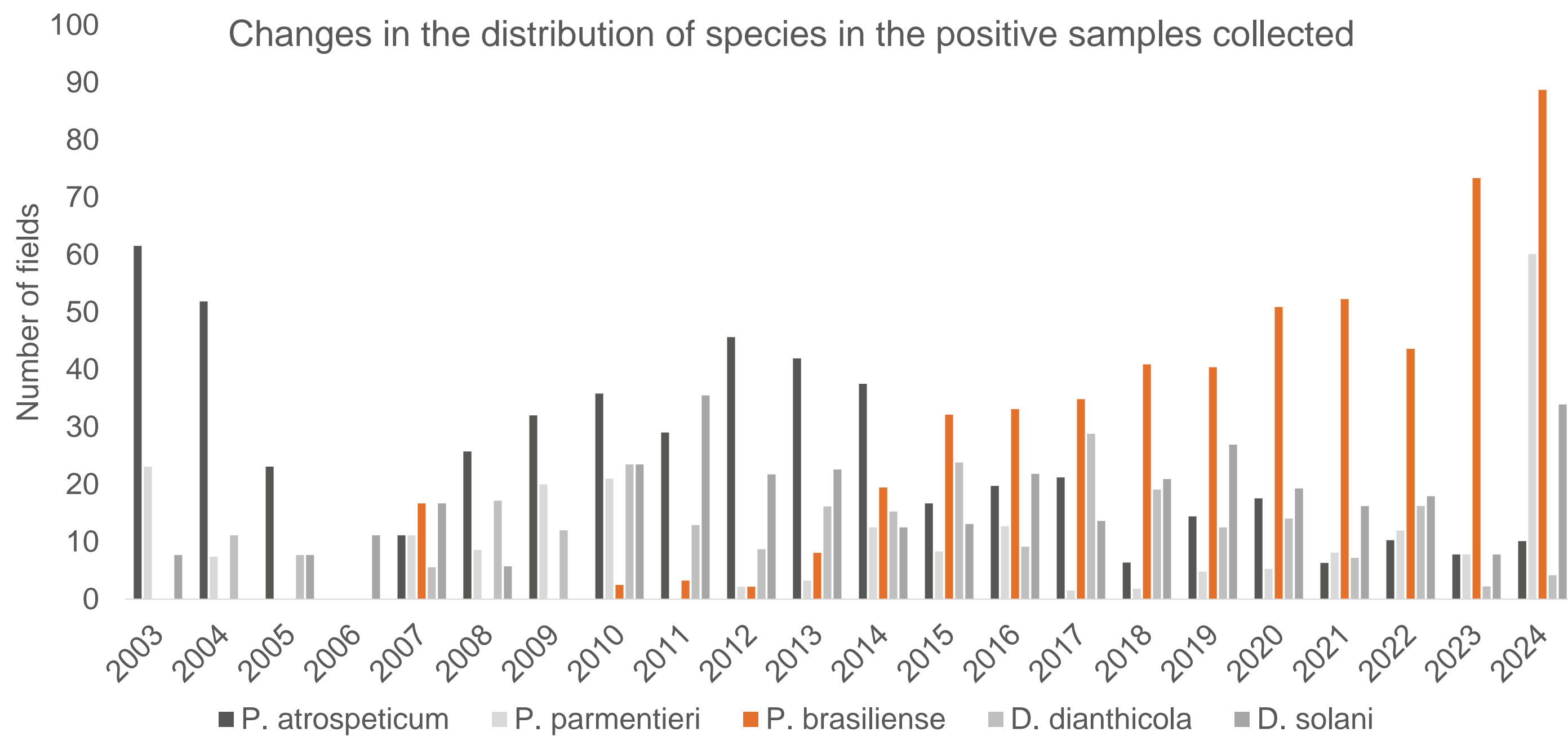


Dickeya solani

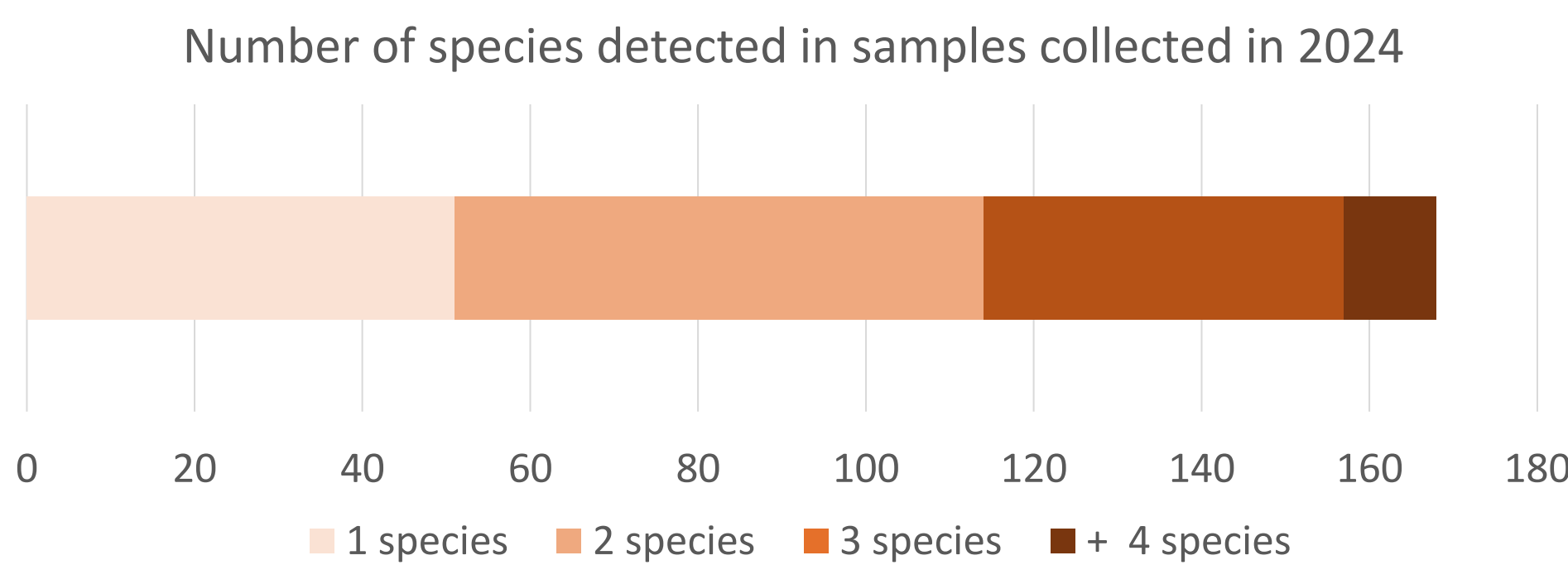


Pectobacterium atrosepticum

- The historical blackleg pathogen *P. atrosepticum* is no longer predominant
- **Predominance of *P. brasiliense*** for the last 10 years in French potato fields

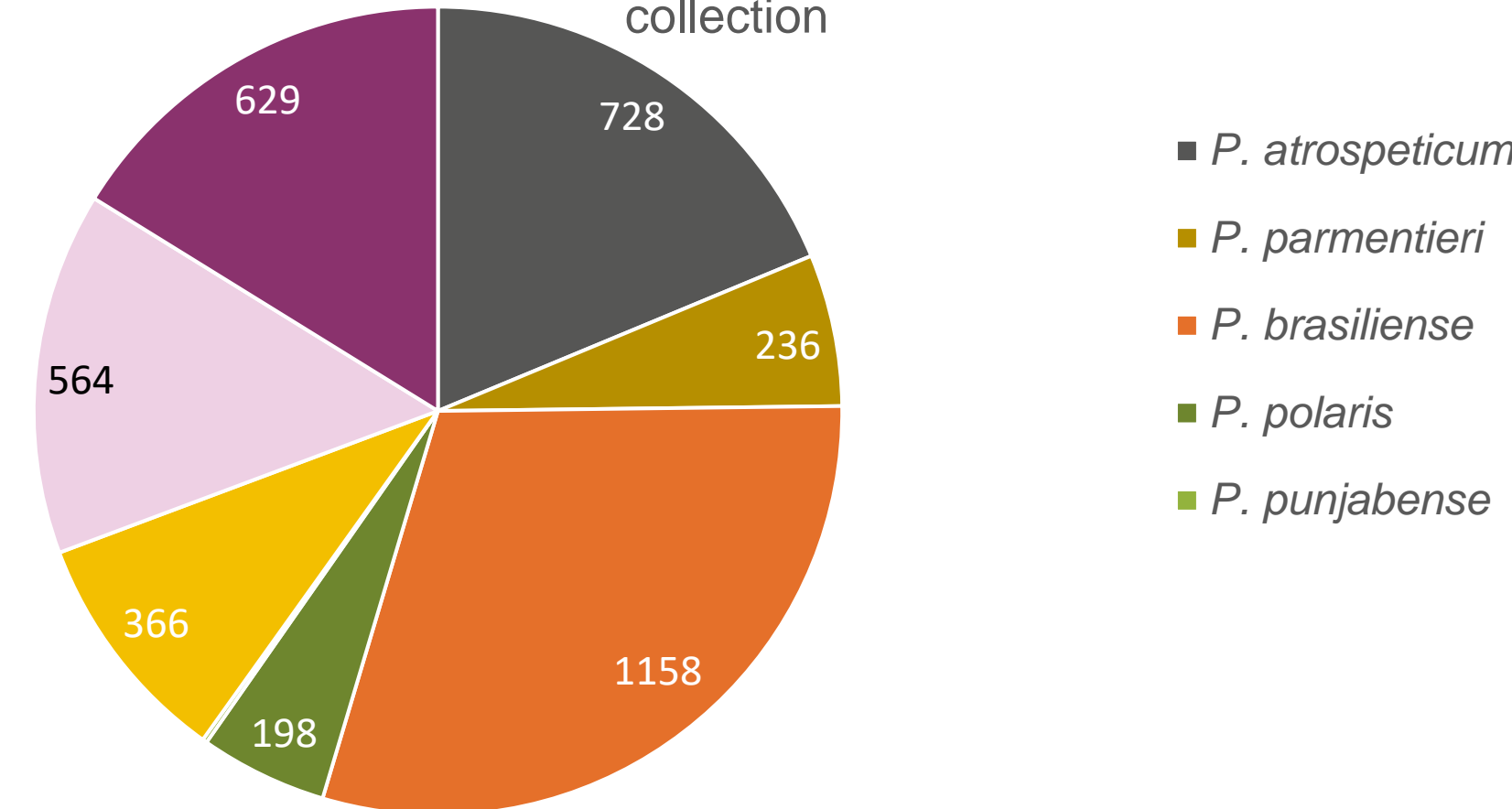


- In most cases, **several species** are detected in the same symptom
- Unlike *Dickeya*, *Pectobacterium* species are often associated



- In 20 years, almost **4000 strains** collected from 1450 fields
- ***P. brasiliense* is the most frequently isolated species**
→ First field trial carried out with a pool of *P. brasiliense* isolates showed a lower level of blackleg symptoms than *D. dianthicola* species ^b
- Nowadays, **no emergence** of new groups / species in France

Distribution of the *Pectobacterium* and *Dickeya* species in the inov3PT collection



Conclusion & Future Work

- A consortium of *Pectobacterium* and *Dickeya* species involved in the development of blackleg symptoms (in which *P. brasiliense* is the most frequently detected species)
- Based on these results, the inov3PT blackleg program is developing 4 research axes:



Study the phenotype including aggressiveness of each species

Development of innovative detection methods

Understanding and prioritizing disease development factors (risk prediction)

Development of control and prevention methods

