

THE BIOPROSPECTING WORKFLOW

ETHNOLOGICAL
KNOWLEDGES
AND USAGES

SUSTAINABILITY
(REWASTE,
RECYCLING)

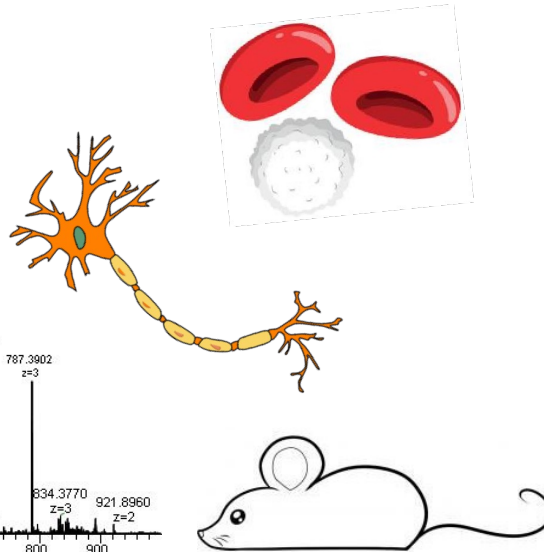
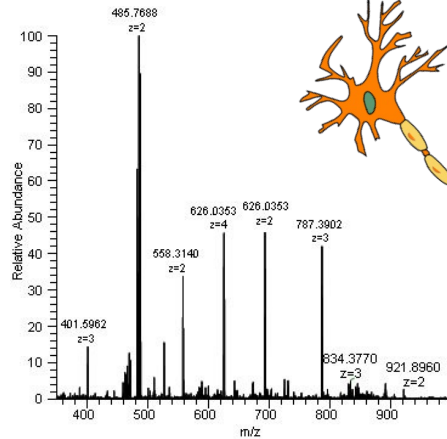
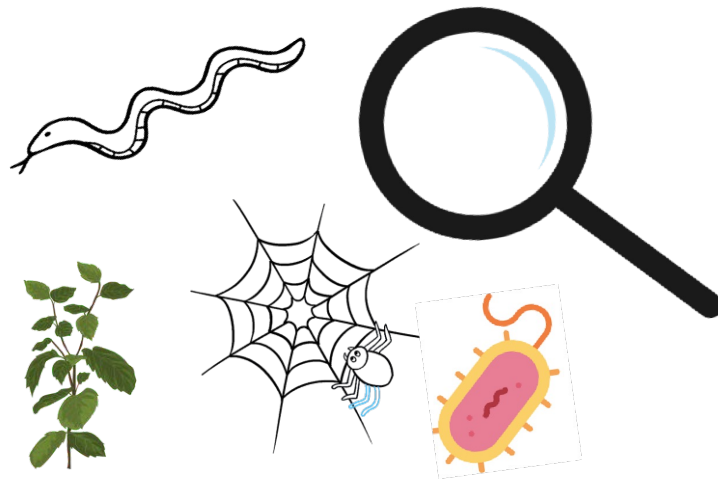
2 ANALYTICAL
DESCRIPTION

3 PRODUCTION AND
EXPLOITATION

1 IDENTIFICATION OF A
BIOLOGICAL MATRIX

CHEMICAL
PROFYLING

EVALUATION OF *IN VITRO*
AND *IN VIVO* ACTIVITIES



4 INCOME

An illustration of several stacks of gold coins, representing income.

DISCOVERY PHASE

COMMERCIALISATION PHASE

BIRDS AND EXOTIC PLANTS

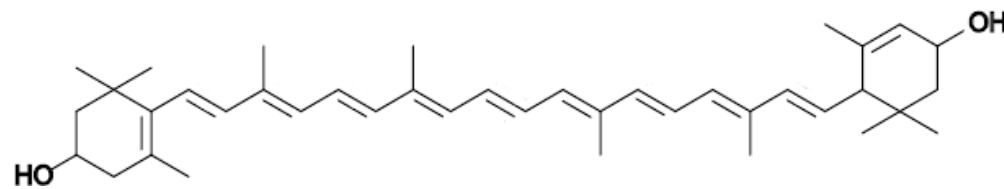
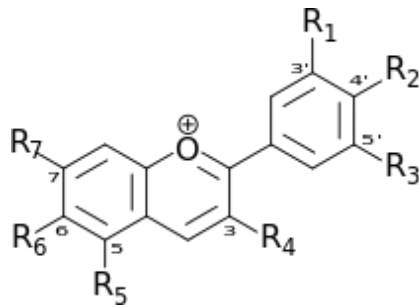
Dissemination → ecosystem service exploited by exotic plant species to spread their seeds in long range distances



In Lombardy alien plant species have spread a lot within last decades and of the total 3100 plant species in our flora 619 are not native (~20%).

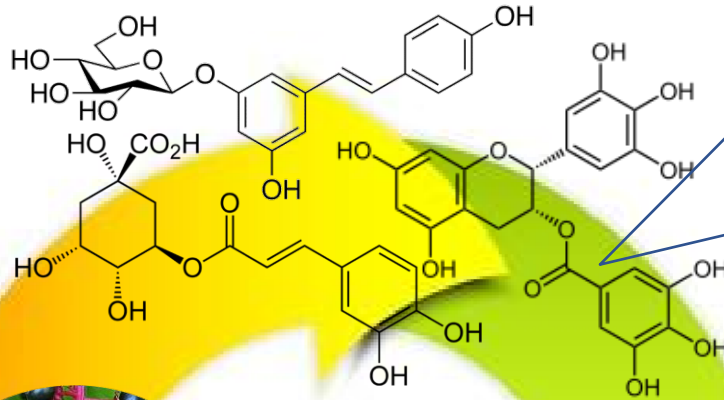
Zoocorous alien plant species are very aggressive due to the capability of disseminating far away from the mother plant (as well as their sprouting capacity)

But the same compounds allowing attractiveness to their fruit are of high nutraceutical value...



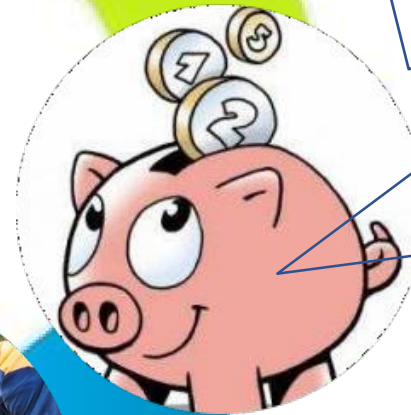
BIOPROSPECTING & CIRCULAR ECONOMY

1. Major infesting plants identification: *Prunus serotina* Ehrh., *Lonicera japonica* Thunb., *Phytolacca americana* L. and sampling of unripe and ripe fruit



2. Extraction of phytocomplexes from fruit matrixes. Focus on polyphenols responsible for ripe fruit attractiveness and unripe fruit bitterness

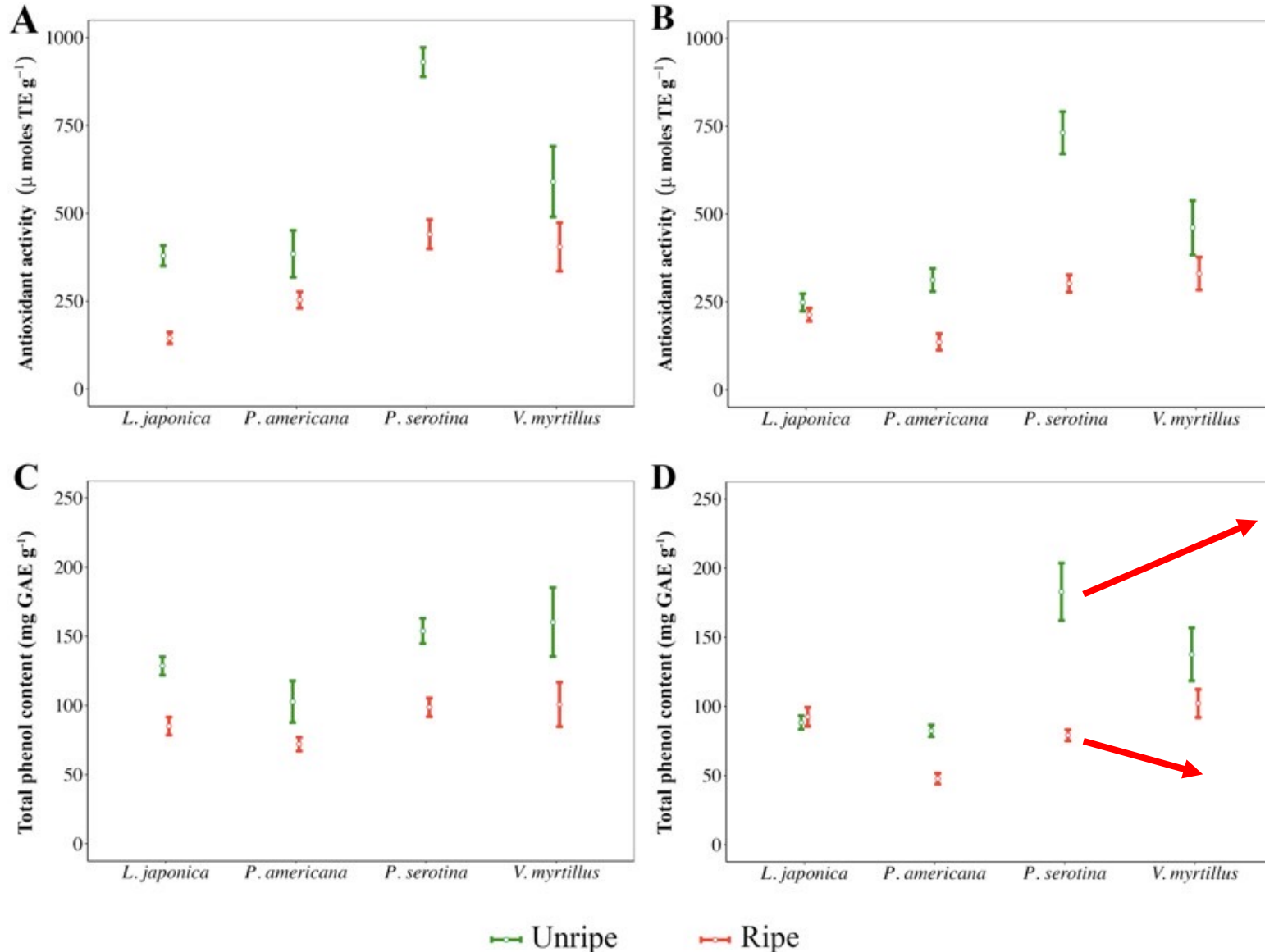
3. Incomes deriving from by-products commercialization (herbicides, nutraceuticals, food supplements...)



4. Economical support for local authorities to perform containment activities



EXPLOITING PLANT PHYSIOLOGY...



A, C: 1:10 w/v drug:solvent ratio, 70% v/v EtOH, 3 extr. cycles indirect sonication

B, D: 6 hours decanted H₂O, 1:10 w/v drug:solvent ratio

Epigallocatechin 3-O- gallate
Caffeic acid
Kaempferol
Rutin
Quercetin

½ phenolics detected in green berries

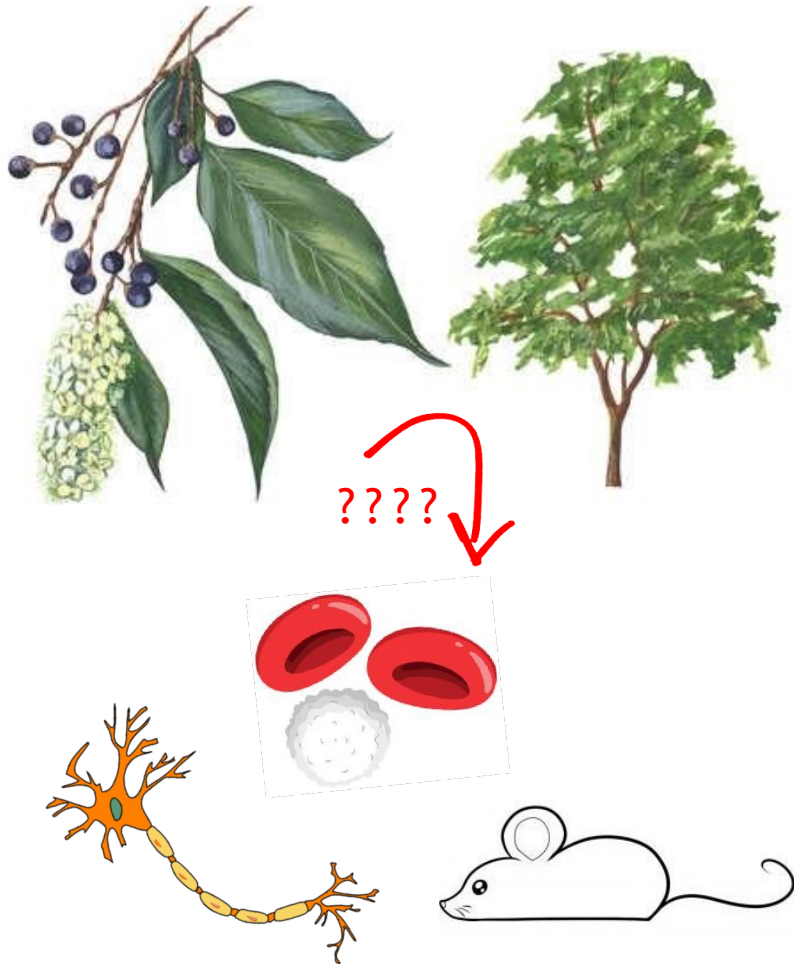
MARKET VALUE OF RECOVERED PHYTOCHEMICALS

Plant species	Phytochemical identity (HPLC-UV-MS ⁿ)	ng compound /mg extract [*]	mg compound /g dry matrix ^{**}	Market value
<i>P. serotina</i>	Epigallocatechin-3-O-gallate	402	39,396	€ 1078
<i>P. serotina</i>	Epigallocatechin	1830	179,34	€ 3011
<i>P. americana</i>	Catechin	2420	108,9	€ 490
<i>L. japonica</i>	Caffeic acid	6230	778,75	€ 1612
<i>P. serotina</i>	Chlorogenic acid	7037	689,63	€ 110
<i>L. japonica</i>	<i>trans</i> -piceide	670	83,75	€ 45

* 6 hrs. decated H₂O

** unripe fruits

HOW TO EXPLOIT THIS BIOMASS?



Prunus serotina is a appreciable source of phenolics in its dispersion organs.

Its containment is really expensive: ~ 830.000 € per 500 ha!

Feasability of utilizing its dispersion organs to be used as herbicides or nutraceuticals??

FRUIT EXTRACTS AS NATURAL HERBICIDES

- ✓ high occurrence of allelopathic compounds
more feasible application than nutraceuticals
- ? stability of the amount of phytochemicals
need to identify stakeholders

