



ALMA MATER STUDIORUM
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Carinata: the EU perspective

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Why carinata is considered a suitable crop for Europe?

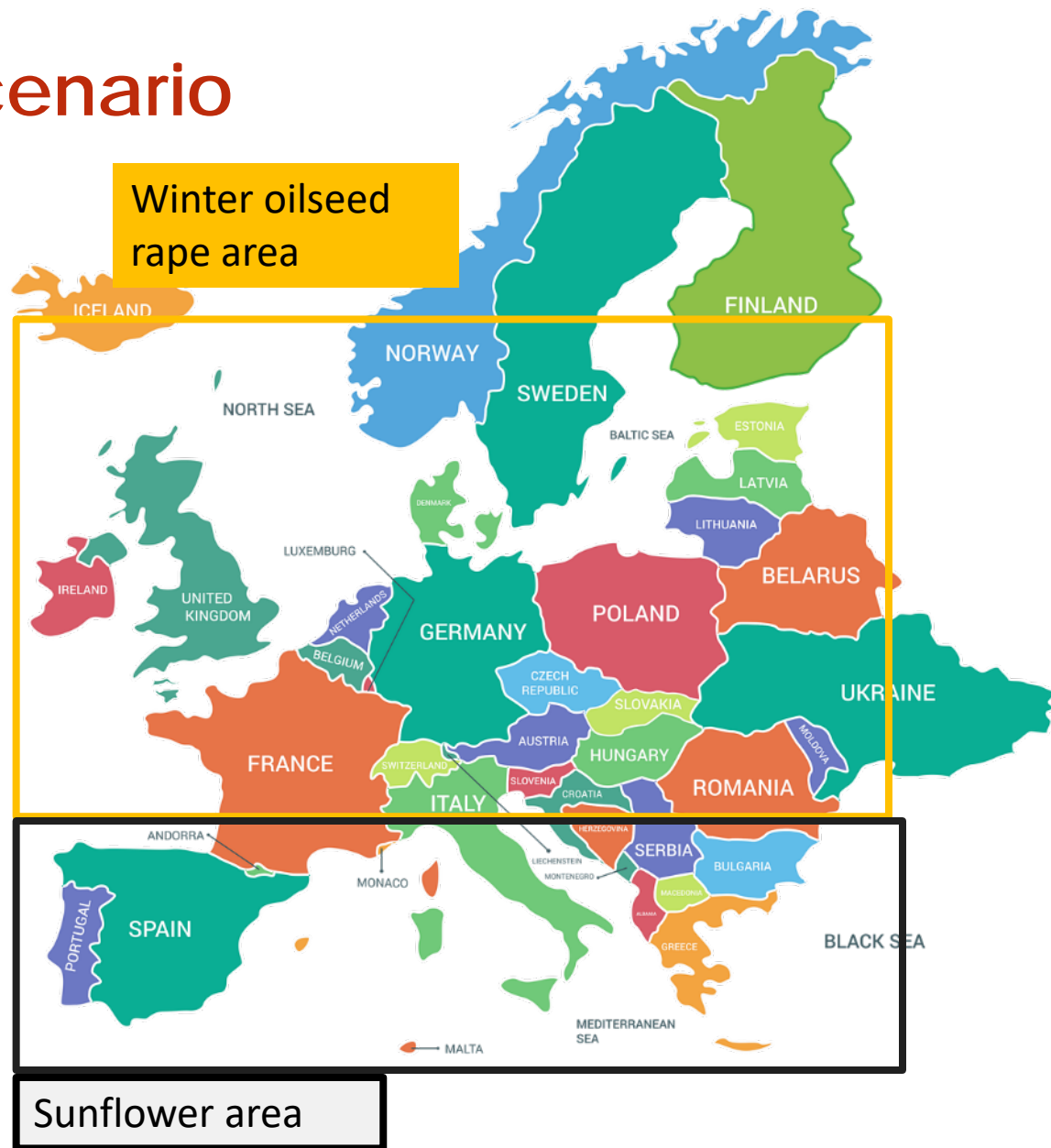
Oilseed crops in Europe

The main oilseed crops grown in Europe are:

- ✓ Oilseed rape (autumn cycle, non-GMO), mean seed yield 3-4 Mg/ha
- ✓ Sunflower (spring cycle) 2-3 Mg/ha
- ✓ Soybean (spring cycle, but very limited growing area ranging between northern Italy to some areas in the Balkans) 2-3 Mg/ha

The European scenario

- ✓ Northern and central Europe are the largest world producers of winter oilseed rape
- ✓ Differently than elsewhere in the world, where mainly spring oilseed rape is grown, i.e. canola in Canada, China, India, etc.



EU Oilseed crops in the climate change scenario

- ✓ The increasing pressure from pests and diseases is making the agronomic management of oilseed rape highly challenging
- ✓ Temperature and water stresses are becoming more and more frequent, both for winter oilseed rape and sunflower, e.g. this summer is extremely high and dry in the southern part of Europe, while in Central/north Europe is very wet with high flooding risks
- ✓ Sunflower is mainly grown in marginal land, where irrigation is not often available, so in case of prolonged drought yield reduction can be significant. In fact EU surfaces of sunflower are highly fluctuating from year to year

EU needs for diversification and protein

- ✓ The new common agricultural policy (CAP) aims at promoting crop diversification
- ✓ EU is a net protein importer for animal feed, since soybean is grown only in small areas, thus the majority of actual protein needs are covered by import or by domestic oilseed rape and sunflower meal
- ✓ Crops, for non-food uses, should not compete with food ones, thus they should be possibly certified as low iLUC (i.e. grown in land or periods of the year when they do not compete with staple crops)

The story of carinata research in Europe and Italy

- ✓ A dedicated EU project was funded by EC from 1997 to 1999 in the FP4.
- ✓ Since then, there were not anymore EU projects fully dedicated to carinata, but it was mainly part of multi-crop projects like ICON, 4FCROPS, CROPS2INDUSTRY, QWATER, EUCLID EU-CHINA.
- ✓ A relevant part of EU research on carinata dealt with its potential for phytoremediation, since contaminated lands are an issue at this moment in Europe.
- ✓ In Italy from mid '80s until 2010 there were several national projects focused on carinata

Why carinata was considered a promising oilseed crop for Europe?

- ✓ Carinata is a very vigorous crop and could grow well also on marginal land, where winter oilseed rape is not able to meet target seed yield
- ✓ Carinata is better tolerant to drought stress than OSR, and establishment could be easier under non optimal soil moisture conditions
- ✓ Carinata is less susceptible to seed shattering than OSR
- ✓ Carinata suffers less from bird predation than OSR
- ✓ Carinata is well adaptable to available equipment at farm level

So in many cases, carinata was identified as a suitable alternative to OSR

The image shows five young plants growing in a row on a sandy, light-brown soil. The plants vary in size and leaf shape. From left to right: the first is a small seedling with two leaves; the second is a larger seedling with three leaves; the third is a medium-sized seedling with three leaves; the fourth is a small seedling with two leaves; and the fifth is a larger seedling with three leaves. The leaves are green and have a slightly serrated or wavy edge. The soil is dry and has some small clumps of grass or weeds scattered around. A white rectangular label with the text 'OSR' is positioned below the first two plants. Another white rectangular label with the text 'CARINATA' is positioned below the last three plants.

OSR

CARINATA





Shortcomings of carinata compared with OSR

- ✓ Lower seed yield
- ✓ Longer cycle (~2 weeks), which does not allow double cropping after carinata harvest
- ✓ Despite being southern Europe characterized by mild winters, the frost tolerant of carinata is very limited when plants have already started stem elongation
- ✓ The presence of GLS still represents a limit for the full use of carinata meal in animal feeding in Europe
- ✓ The presence of erucic acid allows only non-food uses of carinata oil

The idea to apply the same agronomic management of OSR to carinata was NOT GOOD AT ALL



Carinata in Europe nowadays

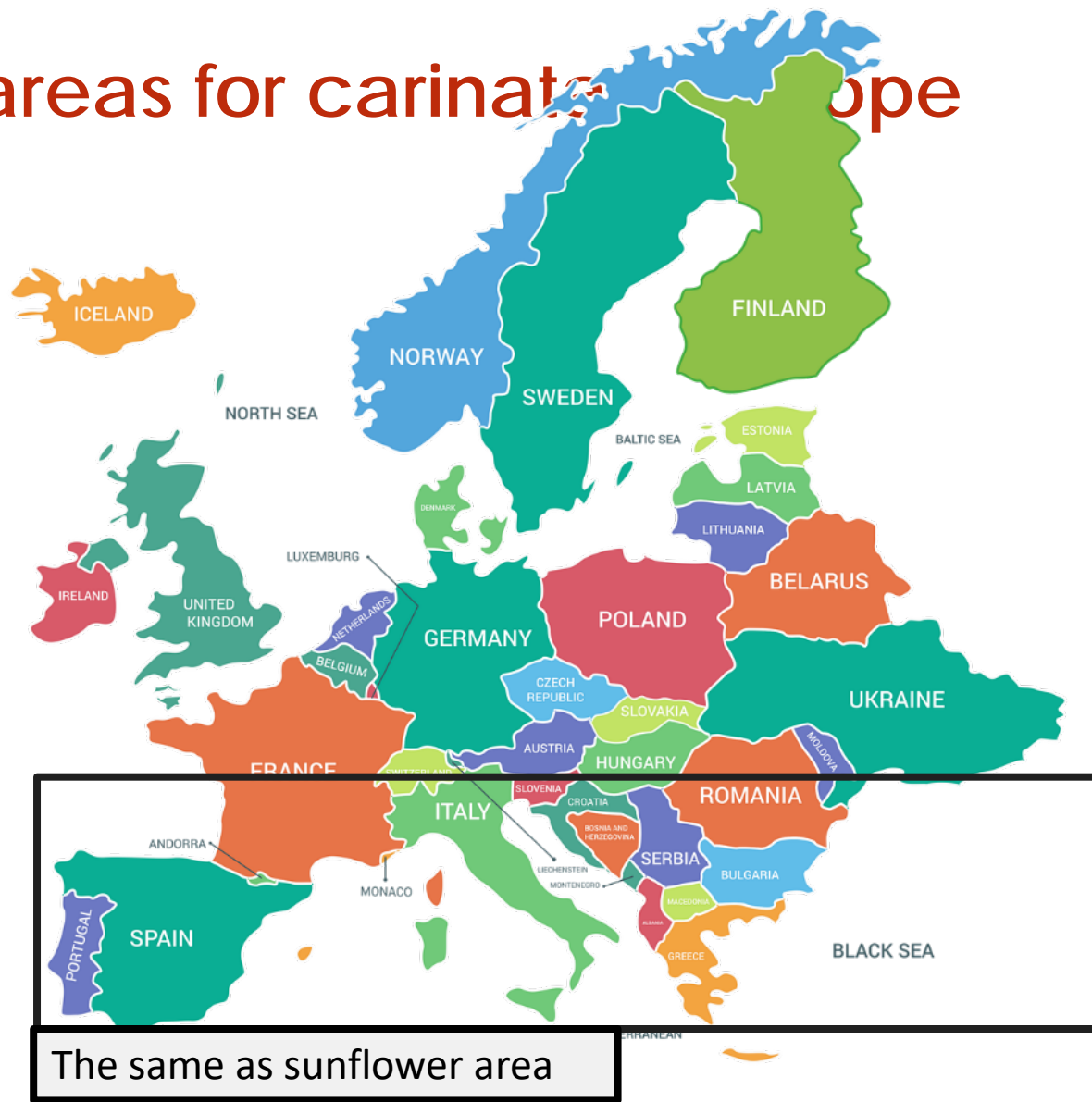
- ✓ After the interest and commercial development until 2010, carinata is now almost completely disappeared at commercial scale
- ✓ Also research on carinata is limited, mainly because of the lack of good breeding material
- ✓ Research on carinata for phytoremediation and biofumigation purposes is still quite active
- ✓ An Italian company (Triumph SPA) developed an organic fertilizer based on carinata meal, with nematocidal effect

Target growing areas for carinata in Europe

Carinata might be an alternative to sunflower

Two cropping strategies could be pursued in this area:

- Autumn sowing, later than the one of OSR
- Summer cover crop, after the harvest of winter cereals



The future of carinata in Europe

The future scale up of carinata in Europe will need to address the following open questions:

- ✓ To improve the genetic “quality” of the breeding material
- ✓ To tailor-made new cropping strategies specific for carinata and related agronomic practices
- ✓ To improve the value of all the different plant parts, in a biorefinery perspective
- ✓ To meet farmers’ expectation and needs for a well defined agronomic management

QUESTIONS?





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