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Knowledge drives change by helping people understand, adapt, and innovate.

Switzerland and Sorghum cultivation

Challenges

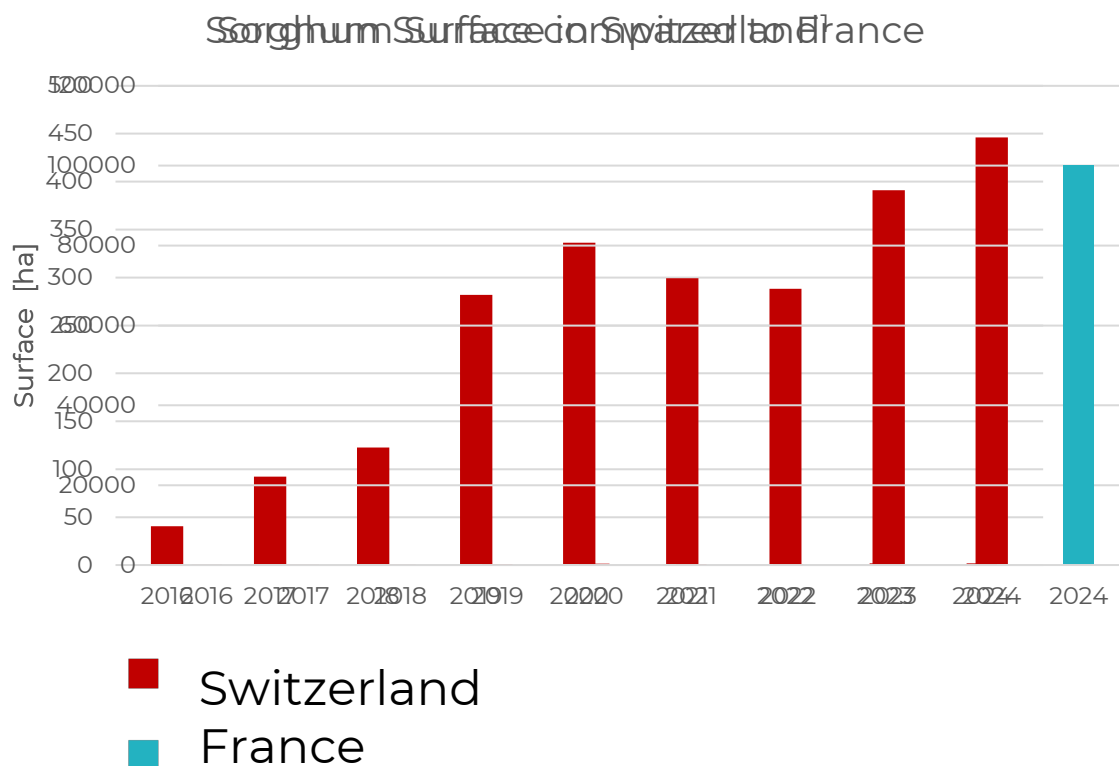
- Limited local expertise and technical guidelines compared to maize.
- Limited availability of adapted varieties (especially early-maturing ones). Neither a Swiss breeding program nor official variety testing.
- Little knowledge on how to use grain sorghum
→ Lack of established markets. Farmers often keep their harvested grains without clear buyers.
- Value chain development still in early stage (processing, food, feed, industry).
- Sorghum mainly known and used as forage crop.



Trial field in Ticino (the southern part of Switzerland where sorghum meets the mountains).

Switzerland and Sorghum cultivation

A small player



But a fine, divers and high potential player

- ✓ Switzerland
 - Highly diverse agriculture (crop rotations, soil and climate, ecological awareness → pesticide and fertilizer reduction)
 - Need of adaptation to increasing temperatures
 - Maize cultivation is becoming increasingly difficult in dry years. In the Italian- and French-speaking regions, alternatives are being explored and interest is increasing.
 - Local products are of high value for consumers
 - Emerging market for gluten-free products
 - Greater attention to nickel intake
- ✓ Ticino
 - Especially exposed to extreme weather.
 - Ticino appears on maps of potential production areas (Agroscope, 2023).
 - Excellent regional speciality products, exported throughout Switzerland.





So let's play the game because sorghum is part of the solution.

RiSorgo Project: Make sorghum «tasty»



Focus of RiSorgo: variety description from field to fork



Agronomy



Pasta quality



Economy

Focus of RiSorgo: variety description from field to fork

- Single row plots: 30 accessions from ICRISAT¹ breeding program.

→ Increase genetic variability base, search for suitable traits.



Agronomy

- 15 varieties tested in small-plot trials, over 3 years at 2 sites.
- On-farm strip trials with 4 varieties, over 3 years at 1 site.

→ Agronomic characterization: Emergence, early vigour, tillering, lodging, maturity, panicle numbers, plant height, yield.

→ Establishment of a VCU² protocol.

¹ International Crops Research Institute for the Semi-Arid Tropics (Kenia).

² Value of Cultivation and Use

Focus of RiSorgo: variety description from field to fork

Preliminary information about ICRISAT accessions

- In 2025 all varieties reached maturity, and differences are present.



Ticino, southern part of Switzerland



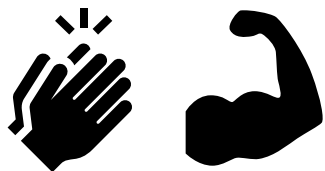
Zürich, north-east part of Switzerland

Focus of RiSorgo: variety description from field to fork

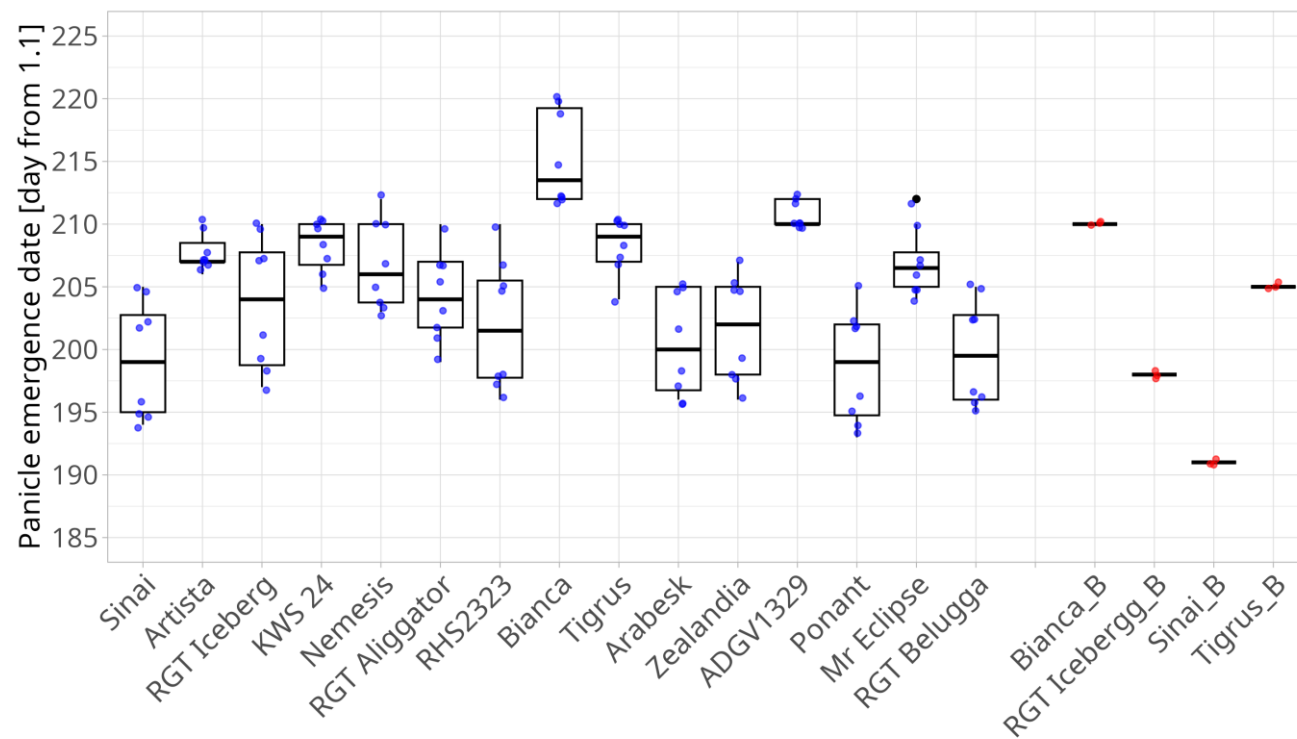
Preliminary results from 15 European varieties

- Heavy rains in spring delayed sowing (29.05).
- Hail damage (12.07), strong weed pressure, and delayed harvest (31.10).

→ Sorghum was highly resistant to this hail event compared to maize.



- Low yields in 2024.
- Variation between varieties was still present.
- Different maturities are present (30 days range).
- Humid autumn and delayed harvest led to fungi on the panicles.



Which challenges will we encounter?

First results from 4 European varieties in 2024

- A humid autumn and the late harvest led to fungi on the panicles.
- High values of ZEA and DON toxins for two early varieties:

Sample from farmer's field	F. equiseti [%]	F. graminearum [%]	F. avenaceum [%]	F. spp. [%]	DON [mg/kg]	ZEA [mg/kg]
Bianca	15	3	1	3	0.34	0.05
Tigrus	17	1	0	5	0.11	0.08
RGT Icebergg	-	-	-	-	2.35	0.73
Sinai	-	-	-	-	1.03	0.18

→ Lessons learned: Pay more for drying costs but assure quality.



Focus of RiSorgo: which challenges will we encounter?

Lodging



...but also lodging caused by the European corn borer (*Ostrinia nubilalis*).

Fusarium Stalk



Variety nr. 7

Fusarium
High incidence

Focus of RiSorgo: which challenges will we encounter?

Sorghum halepense or columbus grass ?

Partly seed lot contamination
in 2024 and 2025.



Focus of RiSorgo: variety description from field to fork



Agronomy



Pasta quality



Link to the fork

Link the quality measurements of varieties in small-plot trials to their quality at the farmer's level and their suitability for pasta making.

Economy

Focus of RiSorgo: variety description from field to fork

Analysis carried out by INRAE laboratory → Hamza Mameri

- Focus on: protein content and digestibility.
- Grain weight, size, color, and hardness.
- Amylose and amylopectin ratio.
- Flour hydration properties, hydrophobic and hygroscopic capacities.
- Gelatinization temperature.
- Comparison with varieties previously studied by INRAE.





Now, let's see how Sorghum pasta is made!



The partners and the people involved

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 **Agroscope**

 **ICRISAT**
INTERNATIONAL CROPS RESEARCH
INSTITUTE FOR THE SEMI-ARID TROPICS

 **OriginTi**
DAL TICINO

 **INRAE**

 **agridea**

 **Sorghum ID**
IL FUTURO PUNTA SUL SORGO

 **GLOBOFOOD**

 **ti** Repubblica e Cantone Ticino
Dipartimento delle finanze e dell'economia





Thank you for your attention!

For more information, visit:
www.agroscope.admin.ch → Sorghum

