



We have
1001 reasons
to invest in sorghum

SORGHUM: SMART FEED, SUSTAINABLE FUTURE

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VENTUROLI

Sementi di qualità dal 1932



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WHAT CHALLENGES FOR LIVESTOCK FARMS IN 2025?

WHAT CHALLENGES FOR FARMERS IN 2025?

1) CONTAIN PRODUCTION COSTS

2) ACHIEVE GREATER EFFICIENCY AND CORPORATE SUSTAINABILITY

(animal welfare, production performance, limiting the use of antibiotics, reducing GHG emissions, N e minerals).

3) PRODUCE FORAGE AND GRAINS ON YOUR OWN FARMS AND/OR IN THE SUPPLY CHAIN FOR THE QUALITY AND QUALIFICATION OF THE FINAL PRODUCT.

THE IMPORTANT ROLE OF GENETICS

The challenges that await us in the coming years are climate change and sustainability, which we can overcome. HOW?

Thanks to the substantial contribution made by **advanced plant genetics**, which can help determine agricultural production that uses **fewer natural resources, fewer pesticides, fewer fertilizers, and lower amounts of energy.**

MASAF



WHY SORGHUM?

1) To CONTAIN PRODUCTION COSTS

**2) For GREATER EFFICIENCY and
CORPORATE SUSTAINABILITY**

**3) To PRODUCE FODDER and GRAINS on YOUR OWN FARMS for the
LOCAL SUPPLY CHAINS → Distributing the VALUE of the supply chain
THROUGHOUT THE TERRITORY**



SORGHUM- A PLANT THAT REPRESENTS RESILIENCE

The 5th most produced cereal on Earth (61.687.000 Tons)
Approximately 40.000 hectares of grain sorghum in Italy,
approx. 25.000 hectares of silage/hay sorghum.

MACROTHERMAL SPECIES

C4 PHOTOSYNTHESIS

LIMITED WATER NEEDS

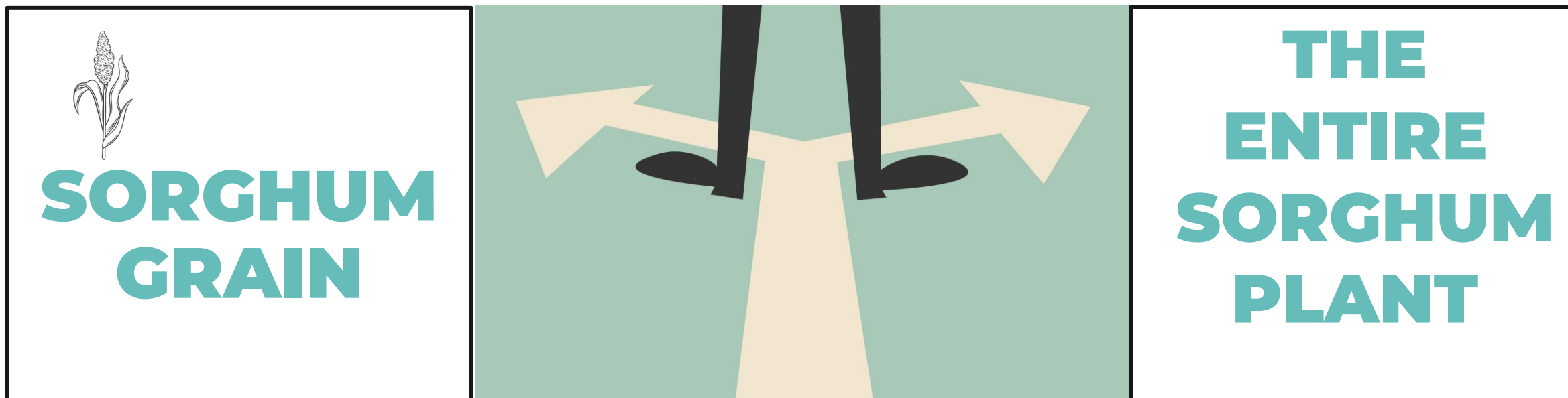
HEALTHY GRAINS FREE OF MYCOTOXINS

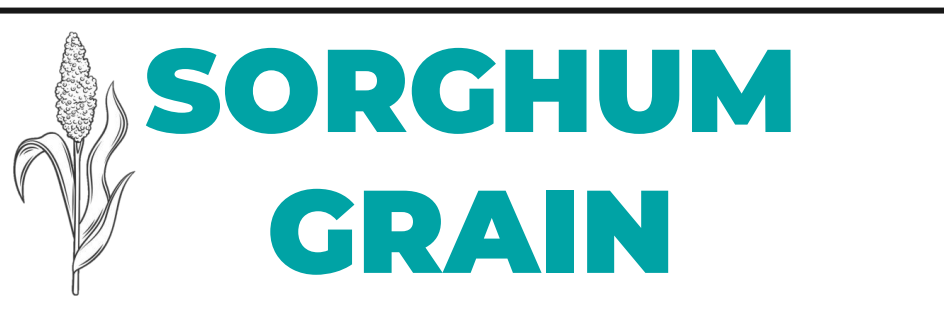
ENERGETIC AND DIGESTIBLE GRAINS

Main destination  ANIMAL FARMING



WHICH APPLICATIONS?





THE ENTIRE SORGHUM PLANT

Fodder and Hays are irreplaceable foods in ruminant rations

Sorghum entire sorghum plant is:

- 1) Produced **directly** on livestock farms
- 2) Interesting for $< \text{CH}_4$ emissions
- 3) High palatability and high digestibility.



The entire sorghum plant: great genetic variability in

Forage Sorghum

SINGLE-CUT :

They are harvested **only once**

MULTI-CUT :

They are generally **mown/grazed**.

SILAGE SORGHUM :

high quality (high palatability and digestibility) silage mainly for beef cattle and dairy cows

es: **Sorghum BMR / sugar sorghum**

BIOMASS SORGHUM WITH GRAIN :

less digestible and more fibrous, large amount of biomass

SUDAN GRASS TYPE :

thin culms and leaves, earlier ripening than hybrids

HYBRID TYPE

(SORGHUM BICOLOR x SUDAN GRASS)
with higher production potential and greater vegetative vigor

The **BENEFITS** of silage sorghum

- **Low water requirement**, compared to silage corn
- **Lower fertilization requirement**
- **Fiber (NDF) more digestible** than corn silage fiber
- **↓ drought stress** (normally the plant is not stressed by lack of water, but its growth slows down and then starts again)
- **Cost-effectiveness of initial investments**
- **Great palatability**
- **Growth speed**

WHEN TO HARVEST sorghum for silage?

Harvest when the dry matter content is
between 27% and 32%

Values lower than 27% reduce ↓ the nutritional value
of the forage

Values above 32% increase the percentage of indigestible
fiber and the presence of indigestible grains

NEW TECHNIQUE

GRAIN SORGHUM + SUGAR SORGHUM



Sown in **ALTERNATE ROWS** (distance between rows 45 – 75 cm)

Promotes competitiveness and height of grain sorghum.

Pay attention to the correspondence of the production cycle between the two materials.

NEW

SORGHUM



GRAIN

SILAGE SORGHUM

GRAIN SORGHUM IN ANIMAL NUTRITION

POULTRY

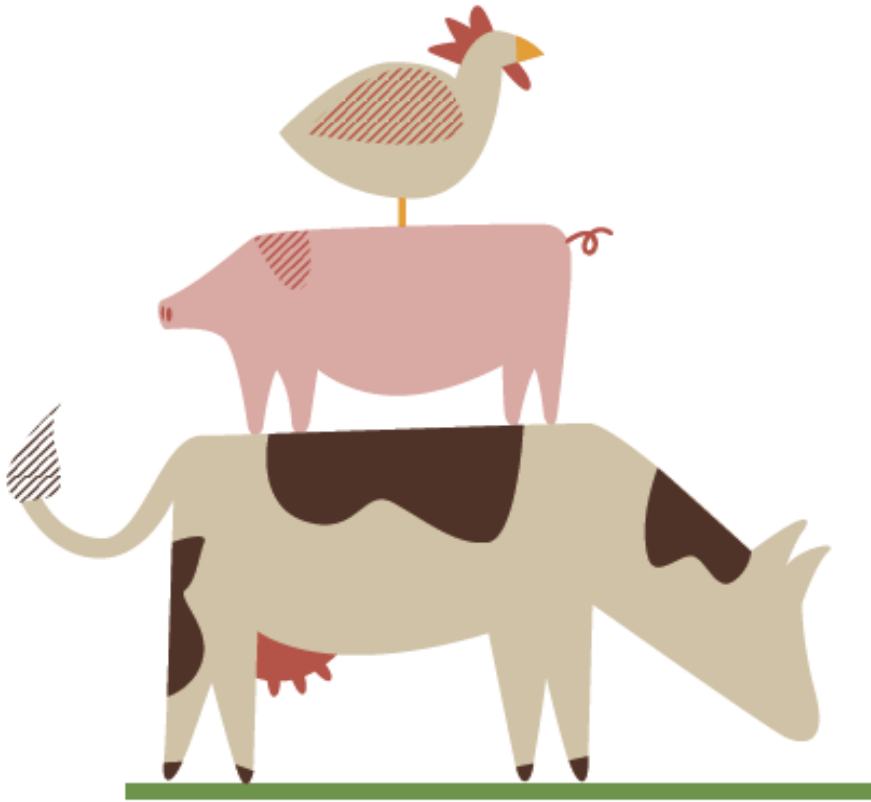
It is the cereal with the highest energy value for chicken. Similar to corn.

PIGS

An energy-rich protein product, it has a high digestible energy content, especially for fattening pigs. Low linoleic acid content.

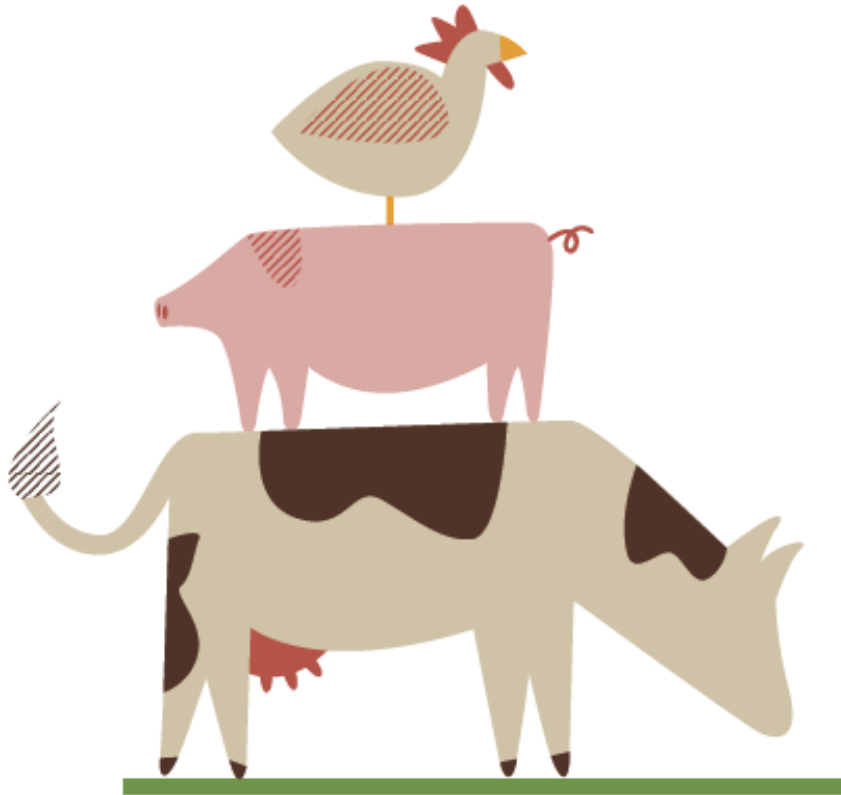
RUMINANTS

Grain sorghum can be included in energy concentrates as a supplement to forage. Unlike wheat, sorghum must be finely milled to be properly digested.



SORGHUM GRAIN APPLIED TO ANIMAL FEEDING

(INRA, 2002)



PIGS

Gross energy(kcal/kg)

ED (kcal/kg)

EM (kcal/kg)

EN (kcal/kg)

LAYING HEN (kcal/kg)

BROILER (kcal/kg)

CATTLE

Ufl (n/kg)

Ufc (n/kg)

CORN

SORGHUM

BARLEY

3860

3900

3810

3390

3400

3070

3310

3320

2970

2650

2620

2280

3200

3300

2750

3130

3230

2610

1.06

1.05

0.95

1.06

1.06

0.93

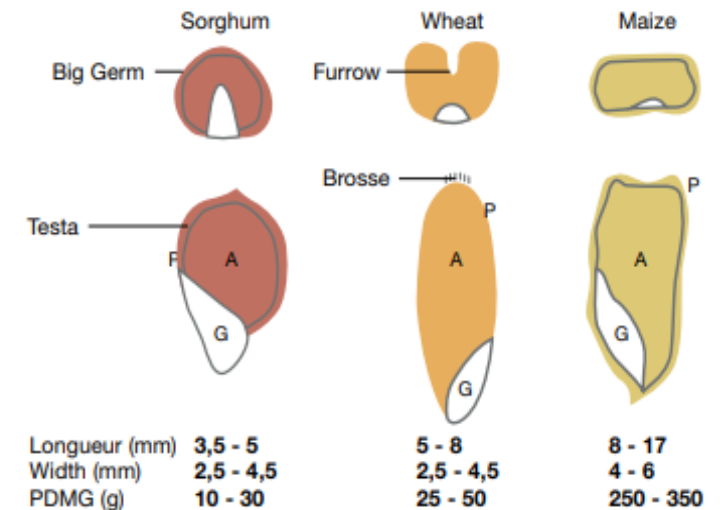
Sorghum Grain Characteristics

- It is the cereal **most similar to corn**, the most used feed.
- **More proteins** and **less lipids**

Predominant use of white varieties
in ITALY.

	<u>Corn</u>	<u>Sorghum</u>
Dry matter(%)	86.4	86.5
Crude protein(%)	8.1	9.4
Raw fibre(%)	2.2	2.4
Crude lipids(%)	3.7	2.9
Ashes(%)	1.2	1.4
Starch(%)	64.1	64.1
Total sugars(%)	1.6	1.1

COMPARATIVE MORPHOLOGY OF CEREAL GRAINS



THE PROBLEM OF CORN MYCOTOXINS

- Sorghum, due to its characteristics and cultivation and harvesting conditions, is less susceptible to fungal attacks and, therefore, to contamination by mycotoxins.
- **EXCELLENT ALTERNATIVE TO CORN!**



SORGHUM APPLIED TO THE POULTRY INDUSTRY



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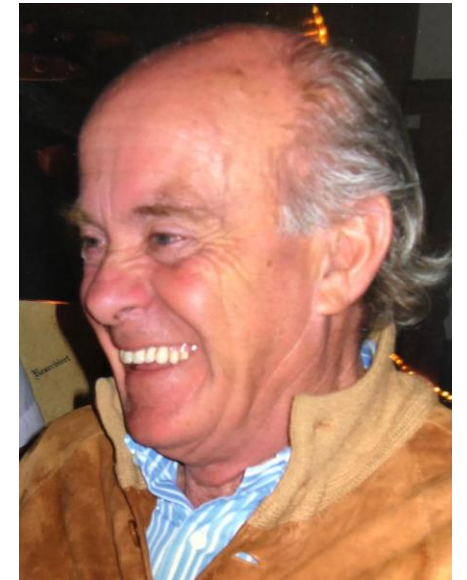
SORGHUM APPLIED TO ITALIAN SUPPLY CHAINS



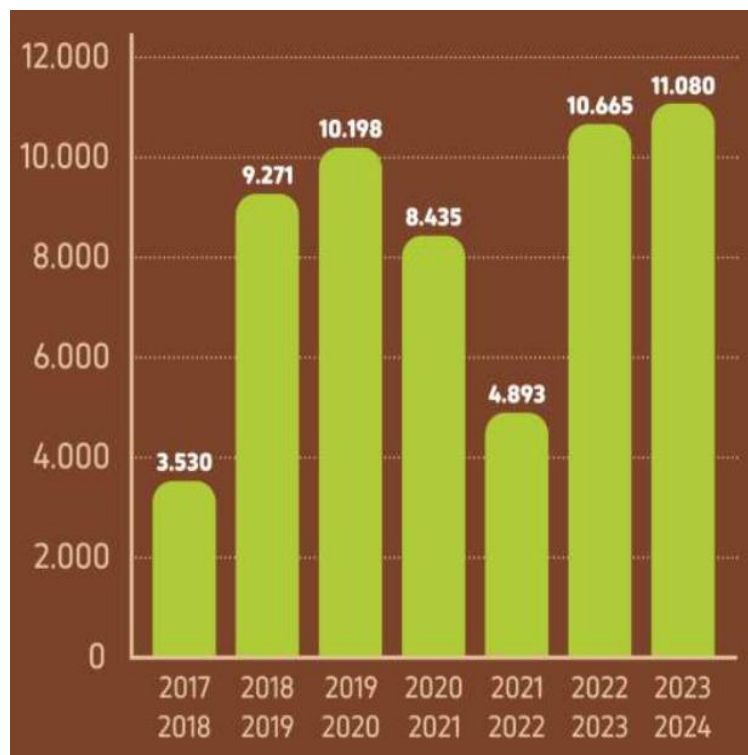
The industrial application of sorghum in livestock feed began with the **POULTRY INDUSTRY** in Italy when Vittorio Venturoli obtained the exclusive right of **ARALBA** variety in **the mid-1980s**.

This **tannin-free variety** represented an opportunity for feed mills and farmers who combined **EXCELLENT PRODUCTION** with attractive prices even in **NON-IRRIGATED AREAS**.

Sorghum cultivation in Italy has specialized in **Emilia Romagna** since then.



SORGHUM APPLIED TO THE ORGANIC POULTRY SUPPLY CHAIN OF A LEADING COMPANY IN ITALY

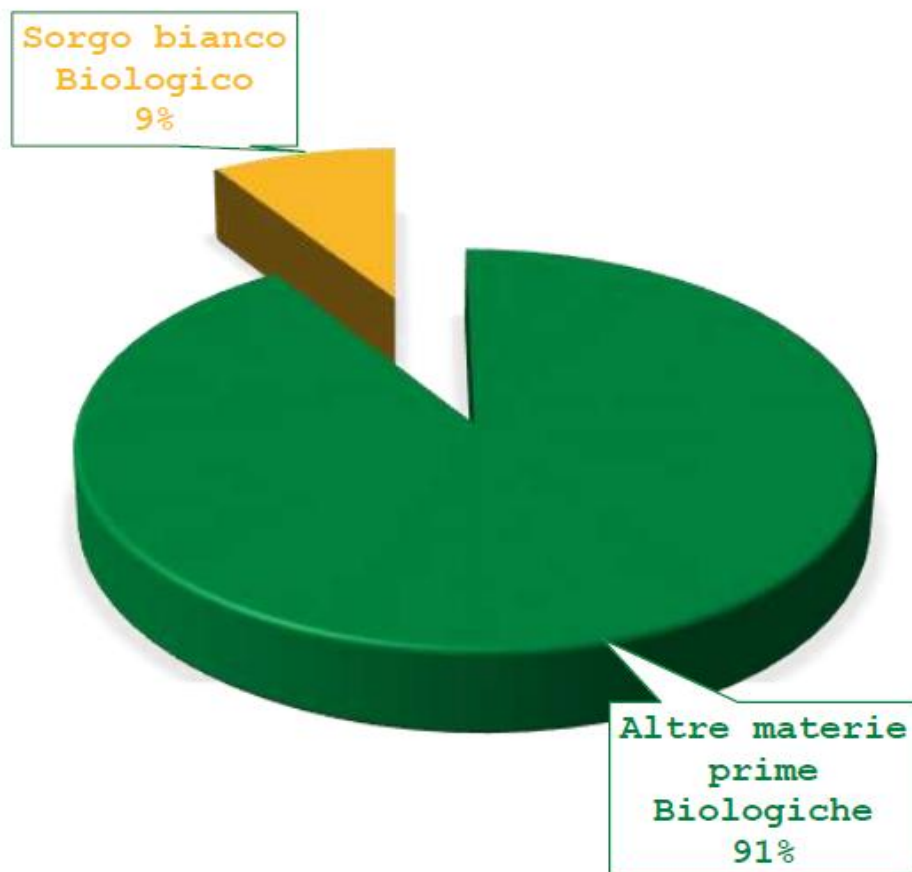


With **11.000 contracted organic hectares** sown in **11 regions** and over **600 producers**, this virtuous company's supply rate is 82%

The hectares of organic sorghum grown in this supply chain **are increasing** ↑ (**313** in 2023, **646** in 2024 and **846** in 2025)

Productivity varies greatly **between Northern and Southern Italy**

SORGHUM APPLIED TO THE ORGANIC POULTRY SUPPLY CHAIN OF A LEADING COMPANY IN ITALY



The varieties used are **white grain** and **free of tannins**.

A percentage **between 7 and 9%** of the ration is used within the formulation, based on the growth period of the animals.

SORGHUM APPLIED TO THE PARMIGIANO REGGIANO SUPPLY CHAIN



Sementi di qualità dal 1932



“THE LAND AND THE LIVESTOCK : A STAINLESS COMBINATION FOR PARMIGIANO REGGIANO»



THE AGRICULTURAL SUPPLY CHAIN

PARMIGIANO REGGIANO

DISCIPLINARY

Art.6 – Raw materials for feed

The following raw materials can be used in the feed:

- Cereals: corn, **sorghum**, barley, oats, wheat, triticale, rye, spelt, millet and panicum
- Semi di oleaginose: soia, lino, girasole
- Legume seeds: broad beans, field beans and protein peas
- Forage: Flours from permitted forage species
- Dried beet pulp
- Potato protein concentrate



EFFECTS OF COMPLETE REPLACEMENT OF CORN FLAKES WITH SORGHUM FLOUR IN DAIRY COWS FED **PARMIGIANO REGGIANO** DRY HAY-BASED RATION - *ITALIAN JOURNAL OF ANIMAL SCIENCE*

- In 2020, the University of Bologna conducted a study on **1.500 cows** producing PARMIGIANO REGGIANO
- **Replace** 10 kg/head/day of corn with 10 kg of sorghum
- **No negative impact**
 - on the health, quantity, and quality of **MILK**
 - yield and quality of **CHEESE**
- **SORGHUM CAN COMPLETELY REPLACE CORN!!!**



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



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EXPERIMENTAL WORK ON SORGHUM IN PARMIGIANO REGGIANO

The University of Bologna has successfully tested the production of Parmigiano Reggiano cheese made from **100% white sorghum flour** instead of 100% corn feed

RAW MATERIAL		CORN FLAKES	SORGHU M FLOUR
First cut hay	kg/t.q.	10	10
Hay	kg/t.q.	1	1
Corn Flakes	kg/t.q.	10	
Sorghum Flour	kg/t.q.		10
Soy F.E. (44%)	kg/t.q.	3,5	3,5
Hydrogenated Fats	kg/t.q.	0,4	0,4
Molasses	kg/t.q.	1,5	1,5

FRACTION		CORN FLAKES	SORGHUM FLOUR
Dry matter	%AF	89,06	88,62
Ashes	%DM	5,82	6,37
<u>Oils and fats</u>	%DM	4,02	3,95
<u>Protein</u>	%DM	14,2	14,7
NDF	%DM	31,64	31,22
ADF	%DM	19,25	19,03
ADL	%DM	3,55	3,48
dNDF24h	%NDF	44,61	44,53
dNDF240h	%NDF	80,03	79,87
<u>Starch</u>	%DM	25,43	24,12

THE ITALIAN SUPPLY CHAIN CHALLENGE: Sorghum as a valid opportunity

In **2024**, Italian agriculture is the **FIRST** in the European Union for added value (42.4 mld)

Increase in Italian agricultural and food exports with the dairy sector playing a key role)

2023	Import (T)*	Autoapprovvigionamento*	Valore stimato
MAIS	6504000	46%	1.300.800.000,00 €
FRUMENTO TENERO	5534000	36%	1.383.500.000,00 €
ORZO	676000	63%	114.920.000,00 €
GIRASOLE	226.000	58%	101.700.000,00 €
SOIA	2.320.000	32%	1.020.800.000,00 €

* Dati ISTAT

Tasso di autoapprovvigionamento = Produzione / Consumi

Part of the added value is distributed **OUTSIDE THE TERRITORY** through the importation of raw materials (in particular cereals and protein-oil seeds) BUT... **SORGHUM IS COMING.**



THE GOAL: PRODUCE AND DISTRIBUTE THE VALUE IN THE TERRITORY!

SORGHUM IN THE PARMIGIANO REGGIANO SUPPLY CHAIN



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

For many years, thanks to **research by the University of Bologna**, the introduction of Sorghum **IN THE RATION** has provided the opportunity to also produce the **FEED** component (in addition to forage) on the Members' Farms and on their own land.

SORGHUM IN THE PARMIGIANO REGGIANO SUPPLY CHAIN



- Over **2.000 lactating cows**
- Over **250 member farms**
- **680.000 quintals of milk** processed in 2024
- **45.300 forms** produced (of which 19.000 organic)
- Aging warehouse with 116.000 forms

SORGHUM IN THE **PARMIGIANO REGGIANO SUPPLY CHAIN**



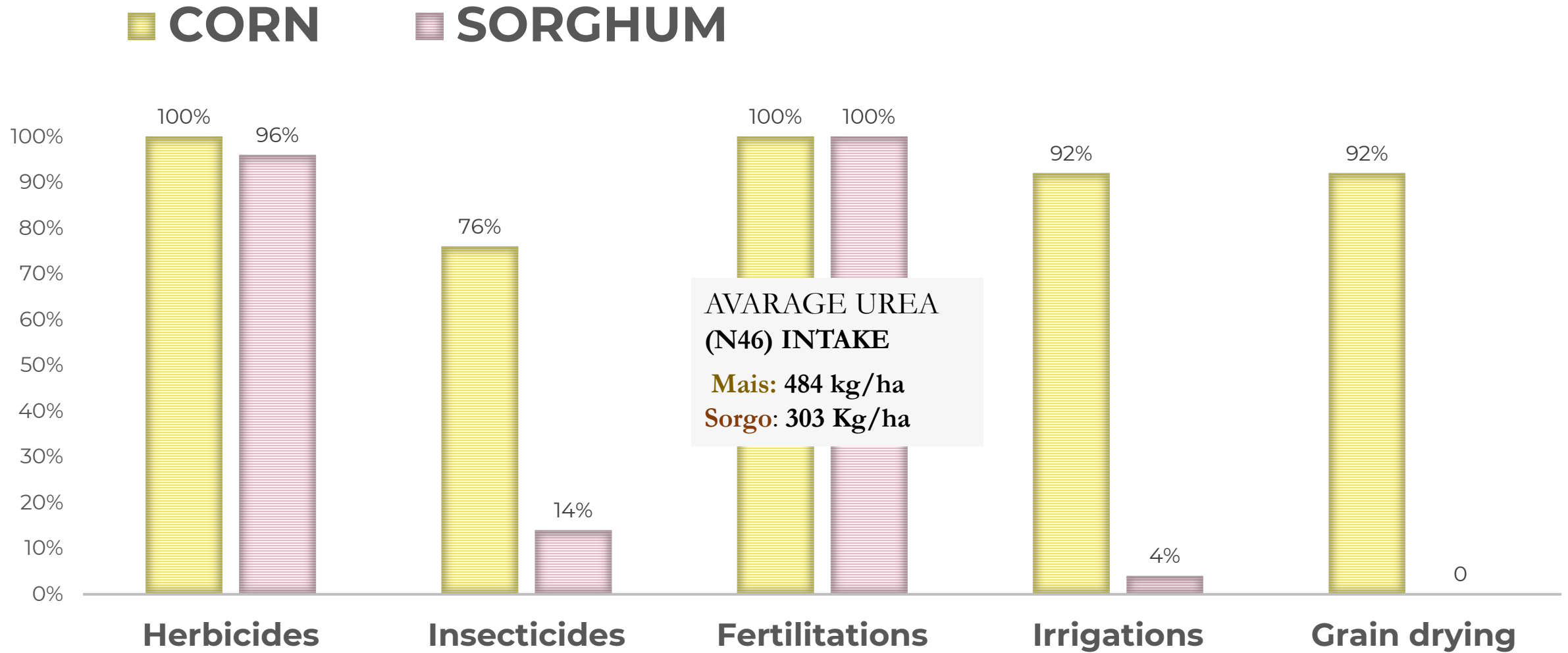
Now the Cooperative's more than 2.000
lactating cows use :

- **SORGHUM flour 2/3 of the ration**
- Corn flakes and barley 1/3 of the ration



PRODUCTION IS IN THE TERRITORY

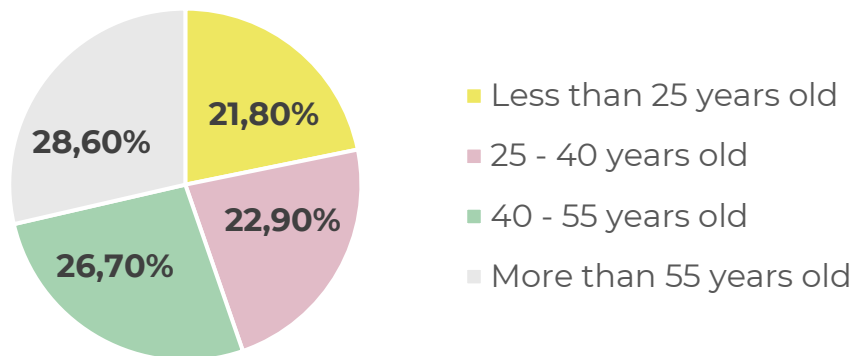
AGRONOMICAL COMPARISON IN PO VALLEY AREA



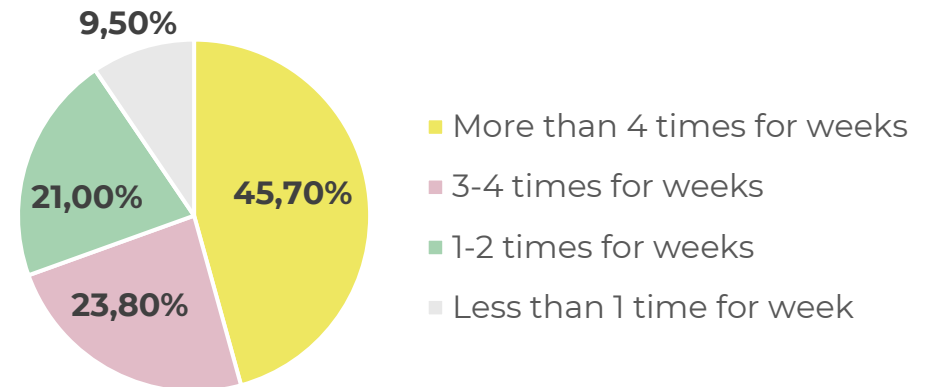
SORGHUM IN THE PR 4.0 SUPPLY CHAIN

After approval from a nutritional point of view, a market survey within the GOI Project that unites partners such as **CRPA, University of Bologna and Albalat** had the objective of understanding how much this more sustainable supply chain (**called 4.0 PR Supply Chain**) could be valorised on the market.

INTERVIEWED AGES



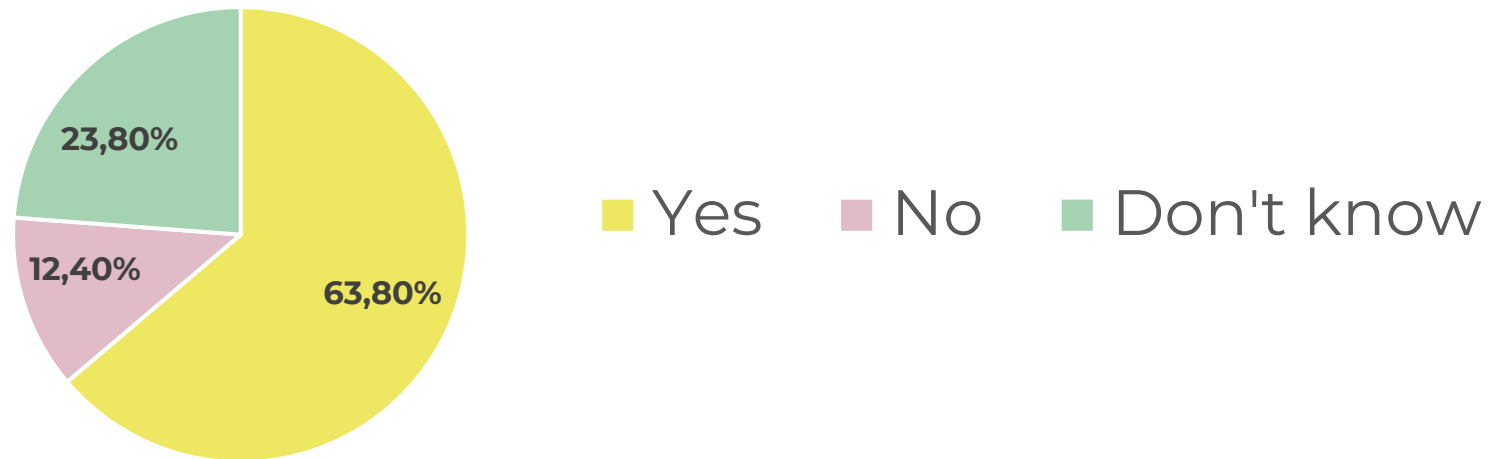
WEEKLY CONSUMPTION



APPROVAL RATINGS FOR A MORE SUSTAINABLE PR 4.0 SUPPLY CHAIN

After Tasting products:

WILLINGNESS TO PAY MORE FOR PR 4.0 SUPPLY CHAIN



63,8% of people would be available to pay more

CONCLUSION

- 1) SORGHUM COULD HELP TO CONTAIN PRODUCTION COSTS
- 2) SORGHUM HAVE A GREATER EFFICIENCY AND MORE SUSTAINABILITY OF OTHER MACROTHERM PLANTS
- 3) SORGHUM COULD HELP TO PRODUCE FORAGE AND GRAINS ON YOUR OWN FARMS AND/OR IN YOUR SUPPLY CHAIN

CONCLUSIONS

THE POSITIVE PERCEPTION OF CONSUMERS,
THE NEW SCIENTIFIC REASEARCH,
THE AWARENESS REGARDING THE POTENTIAL OF
SORGHUM MAKE IT:

A SMART FEED FOR A SUSTAINABLE FUTURE.



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