



## SUMMARY FACTSHEET – TRITICALE

Triticale is a Poacea obtained from a cross-breeding between wheat (*Triticum* genus) and rye (*Secale* genus). Varieties considered for biomass production (harvesting of the whole plant) are the same than those used for animal fodder.



Triticale (*Triticosecale Wittm.*)

Primary end use : Combustion (main use), biogas production, second-generation biofuels

Prefered conditions for establishment : Large array including hydromorphic soils. Temperate climates are preferred while cold climates can be considered too.

Crop establishment : October/November

Ploughing density : 180 to 260 seeds/m<sup>2</sup>

Production : 8 to 10 months cycle duration depending on harvest stage, minimum 10 to 15 tDM/ha

Harvest : at the medium milk/soft dough stage (silaging is required) or when at fully ripe grain stage (dry product)

### Crop assets and constraints :

Assets	Constraints
Annual crop, easy to introduce in a crop rotation system	Low density of harvested biomass
Many available varieties adapted to various soil and climate conditions	High humidity at the harvest if / strongly depending on the harvest stage of the cereal
Interesting potential of biomass production	Sensitive to lodging
Rustic crop with low phytosanitary and fertilizer input (nitrogen, phosphorus, potassium)	
Valorisation of the whole plant (seeds + straw)	
No specific material required	
High resistance to cold climates	
Opportunity to produce in double cropping systems as energy cover crop	

#### **Crop Establishment**

Triticale can be implanted on a large array of climate and soils (including hydromorphic soils, considering this cereal is quite resistant to fungus attacks). It is sowed from October to November, depending on the variety and the region of establishment.

Soil must be prepared as it is usually realized for any cereal sowing.

In order to avoid lodging, opt for a precocious sowing at low density (180 to 260 seeds/m<sup>2</sup>).

#### **Crop Management**

Crop management sequences do not differ from conventional cultivation of triticale (for seed production) : only the dates/period for nitrogen supply are modified and one of the fungicide applications can be removed.

Nitrogen input is lessened for biomass production : 120 to 180 kg N/ha, with subdivision of the required dose during the bolting stage. The final input (before harvest) is not necessary. No irrigation is required, except for pronounced dry seasons.

Triticale is resistant to most diseases but is very sensitive to lodging : extreme care must be provided with adequate sowing density, variety selection and dates of nitrogen supply.



## Harvest

Whole biomass of the cereal can be realised at different stages of the plant development:

- From medium milk to soft dough stage : silaging is realised as to store the harvested biomass (with high humidity) in good conditions ;
- Fully ripe grain stage : the harvested biomass is dry, easy to store and adapted to combustion kind of use. Reaping and windrowing must be realised in the meantime.

Approximative biomass production vary from 8 to 15 tDM/ha.

## Potential biomass production according to crop management

	Cycle duration	Harvest date	Dry Matter rate (in %)	Biomass production
Medium milk to soft dough stage <b>Favorable situation</b>	8 months	May	20 to 35%	8 to 15 tDM/ha
Fully ripe grain stage <b>Favorable situation</b>	10 months	July	80 to 85%	10 to 15 tDM/ha
Fully ripe grain stage <b>Unfavorable situation</b>				6 to 12 tDM/ha

### Production Costs

Low establishment costs, equivalent to wheat.

- Operational costs (seeds, fertilizers, fuel, etc.): approx. 300 €/ha
- Specific costs : approx. 150 €/ha

### Environmental impacts

**Low** water consumption

Phytosanitary inputs : **relatively high** compared to other perennial lignocellulosic crops but relatively low compared to food crops. TFI = 1.5  
Energy production / consumption : **relatively high** consumption of energy compared to other lignocellulosic plants but high energy efficiency.  
GHG emissions : **high**, superior to 2.000 kg eq CO<sub>2</sub>/ha but **low** regarding energy content

## Valorisation

- Nowadays use :
  - Combustion: pellets, bulk
  - Biogaz for immature crops (energy cover crops)

- Developing use:
  - Second generation biofuel