

# Poplar Cultivar 'MARKE'

## Passport

Interspecific hybrid	<b><i>Populus.deltoides</i> x (<i>Populus trichocarpa</i> x <i>Populus maximowiczii</i>)</b>		
Parents	Mother	<b><i>P.deltoides</i></b> 'S.333-44' (Michigan)	
	Father	'S.725-37' = <b><i>P.trichocarpa</i></b> 'S.3-5'* x <b><i>P.maximowiczii</i></b> (Japan)	
		<b><i>P.trichocarpa</i></b> 'S.3-5' * = <i>P.trichocarpa</i> 'V.26' (Washington) x <i>P.trichocarpa</i> 'V.23' (Idaho)	
Creation	1970, by controlled crossing at INBO, Geraardsbergen, Belgium		
Plant Variety Protection Certificate	EU 44786 from 17/10/2016		
Gender	Female		
INBO Breeding nb	<b>70.078/2</b>		

## Phenotype

- Stem form    straight
- Forking      rarely
- Branch thickness    forming of a few thick branches at a height of 6m or more
- sidewalk clearance starts at the tree age of 3-5 years



## Phenology

At the INBO nursery in Geraardsbergen (50° 48' N, 3° 57' E) , the cultivar 'Marke' reaches bud burst in the first week of April and the timing of bud set in autumn is mid September. (Fig. 1).

Fig 1. Phenology of the cultivar Marke compared to the INBO cultivars Dender, Bakan, Skado and Vesten and observed in the INBO nursery at Geraardsbergen (2015)

	Bud burst											Bud set						
	17-march	24-march	31-march	7-april	14-april	21-april	28-april	5-may	11-may	18-may	juin	july	august	7-sep.	14-sep.	21-sep.	28-sep.	5-oct
<b>Dender</b>				■	■	■	■	■	■	■	■	■	■	■	■			
<b>Marke</b>				■	■	■	■	■	■	■	■	■	■	■	■			
<b>Bakan</b>			■	■	■	■	■	■	■	■	■	■	■	■	■	■		
<b>Skado</b>			■	■	■	■	■	■	■	■	■	■	■	■	■	■		
<b>Vesten</b>						■	■	■	■	■	■	■	■	■	■			

## Growth characteristics

Fig 2. Height and diameter of two-year-old trees of the cultivar Marke in the INBO nursery at Geraardsbergen, compared to the INBO cultivars Dender, Bakan and Skado

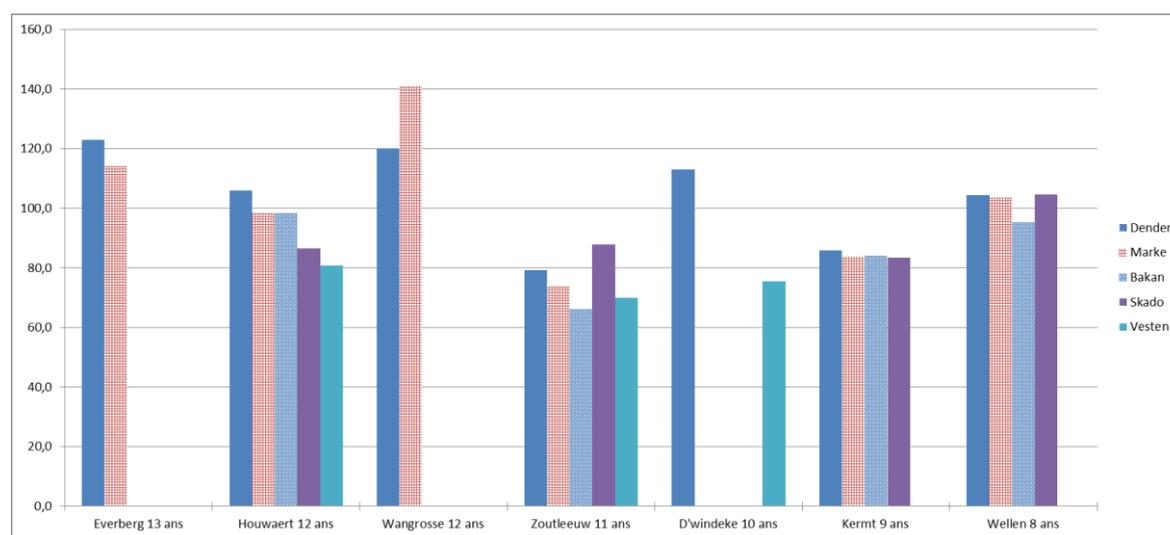
Cultivar	# trees	Height(cm)	Category 1 (D25-30mm) (%)	Category 2 (D30-40mm) (%)	Category 3 (D40-50mm) (%)
<b>Dender</b>	27	424	0	37	63
<b>Marke</b>	21	406	0	29	71
<b>Bakan</b>	32	523	16	72	13
<b>Skado</b>	37	556	40	57	3

The *Mean Annual Increment* (MAI) – circumference- has been measured in 7 field trials installed in the north of Belgium on different soil types (Fig. 3 below) and ranges between 8 cm and 12,2 cm.

Fig 3. Soil properties of the 7 field sites mentioned below

Fieltrial name	Everberg	Houwaert	Wangrosse	Zoutleeuw	Denderwindeke	Kermt	Wellen
Soil texture	No profile	B-horizont	No profile	B-horizont/ No profile	No profile	No profile	
Soil profile	very strong gleying clay soil	moderate gleying sandy loam soil	strong gleying loam soil	Weak/modera te gleying loam soil	strong gleying loam soil	strong gleying loam soil	peat

Fig 4. Mean annual increment (circumference in cm) of the cultivar Marke in seven field trials aging from 8 to 13 years compared the INBO cultivars Dender, Bakan, Skado and Vesten (planting distance - 8m x 8m)



*Dender* = *P. deltoides* x *P. trichocarpa* x *P. maximowiczii*

*Bakan* = *P. trichocarpa* x *P. maximowiczii*

*Skado* = *P. trichocarpa* x *P. maximowiczii*

*Vesten* = *P. deltoides* x *P. nigra*

## Wood technology

Wood properties were obtained from the Laboratory for wood technology, University of Ghent, Belgium.

<b>Physical properties</b>	
Wood density (60%RV)	380 – 420 kg/m <sup>3</sup>
Heartwood proportion (%)	15-55
Tension wood proportion (%)	20-36
<b>Mechanical properties</b>	
Modulus of elasticity (N/mm <sup>2</sup> )	5000-8200
Modulus of rupture (N/mm <sup>2</sup> )	40-56
<b>Industrial processes</b>	
veneer A/B-grade (%)	45
C1-grade (%)	55
<b>The wood is suitable for</b>	
Veneer **	Good / very good (even for CE multiplex)
Saw wood	Good/very good

<b>Physical properties</b>	
Wood density (60%RV)	405 ± 41 kg/m <sup>3</sup>
Heartwood proportion (%)	20-40
Tension wood proportion (%)	20-36
<b>Mechanical properties</b>	
Modulus of elasticity (N/mm <sup>2</sup> )	5200-8200
Modulus of rupture (N/mm <sup>2</sup> )	40-45

Industrial processes	
veneer A/B-grade (%)	35-40
C1-grade (%)	60-65
<b>The wood is suitable for</b>	
Veneer **	Good / very good (even for CE multiplex)
Saw wood	Good/very good

### Disease resistance

The cultivar 'Marke' has been tested and selected for its good resistance/tolerance to the leaf rust *Melampsora larici-populina*, leaf spot disease caused by *Marssonina brunnea*, bacterial canker caused by *Xanthomonas populi* and woolly aphid, caused by *Phloemyzus passerinii*.

- Resistance to *Melampsora larici-populina* and *Marssonina brunnea* has been observed during several consecutive years at the INBO nursery in Geraardsbergen.
- Resistance to *Xanthomonas populi* has been tested by artificial infection on five 2-year-old trees
- Resistance to *Phloemyzus passerinii* has been tested by artificial infection at the CREA Centro di ricerca Foreste e Legno ,Casale Monferrato, Italy

Fig 5. Resistance of the cultivar Marke to the most important poplar diseases in Europe

Cultivar	Leaf rust ( <i>Melampsora larici-populina</i> )	Leaf spot disease ( <i>Marssonina brunnea</i> )	Bacterial canker ( <i>Xanthomonas populi</i> )	Woolly aphid ( <i>Phloemyzus passerinii</i> (Sign.))
Vesten	tolerant	tolerant	tolerant	Field tolerant
Bakan	tolerant	tolerant	tolerant	tolerant
Skado	tolerant	tolerant	tolerant	tolerant
Dender	Very tolerant	tolerant	tolerant	tolerant
<b>Marke</b>	<b>Very tolerant</b>	<b>tolerant</b>	<b>tolerant</b>	<b>tolerant</b>

## Biomass production under short rotation coppice

Realized dry weight (ton/ ha/ y) for the cultivar Marke under short rotation coppice has been measured in an experimental site located in Grimminge (Belgium) and planting density of 10.000 cuttings/Ha.

The plantation has been harvest after 2, 4 and 6 years. Fig.6 shows realized dry weight after 6 years. Marke is producing 19.9 ton / ha/ y after the third harvest.

Fig 6. Biomass production (dry weight) after three 2-year coppice rotations

CULTIVAR	Realized dry weight ton/jr.ha	Mean height/shoot cm	mean diameter/shoot cm	# shoots /stool
Dender	24,5	435	2,8	4,2
<b>Marke</b>	<b>19,9</b>	<b>396</b>	<b>2,4</b>	<b>5,1</b>
Bakan	17,4	397	2,4	3,4
Skado	18,4	360	2,0	5,0

Ir. Linda Meiresonne, 2018 (INBO)