



ATB
Leibniz-Institut für Agrartechnik
Potsdam-Bornim e.V.



Kranemann



State of the art and perspective of hemp mechanization: where do we need to go?

 **MultiHemp**

H.-J. Gusovius & C. Lühr; Leibniz Institute for Agricultural Engineering Potsdam-Bornim,
H.-H. Kranemann & B. Stezenko; Kranemann GmbH



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Where do we need to go?



As much as
plant material/
products

Natural
conditons
(botany, climate)

Costs/efficiency

Quality



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Quality management within the (whole!) supply chain

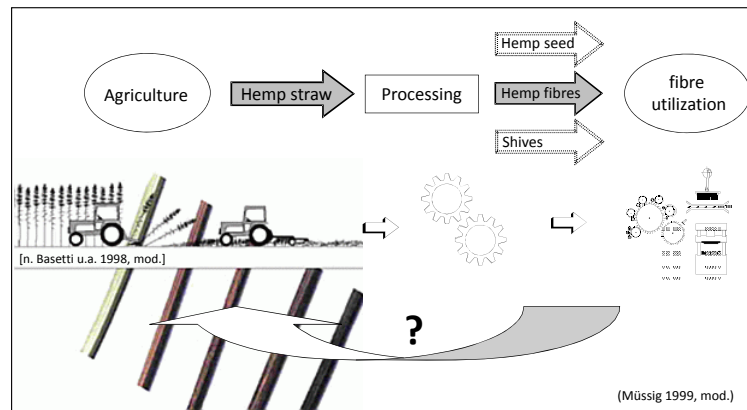
Regulations
Farming & varieties
Harvesting technology and time
Weather



Technology



Processing and product requirements



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Products from hemp

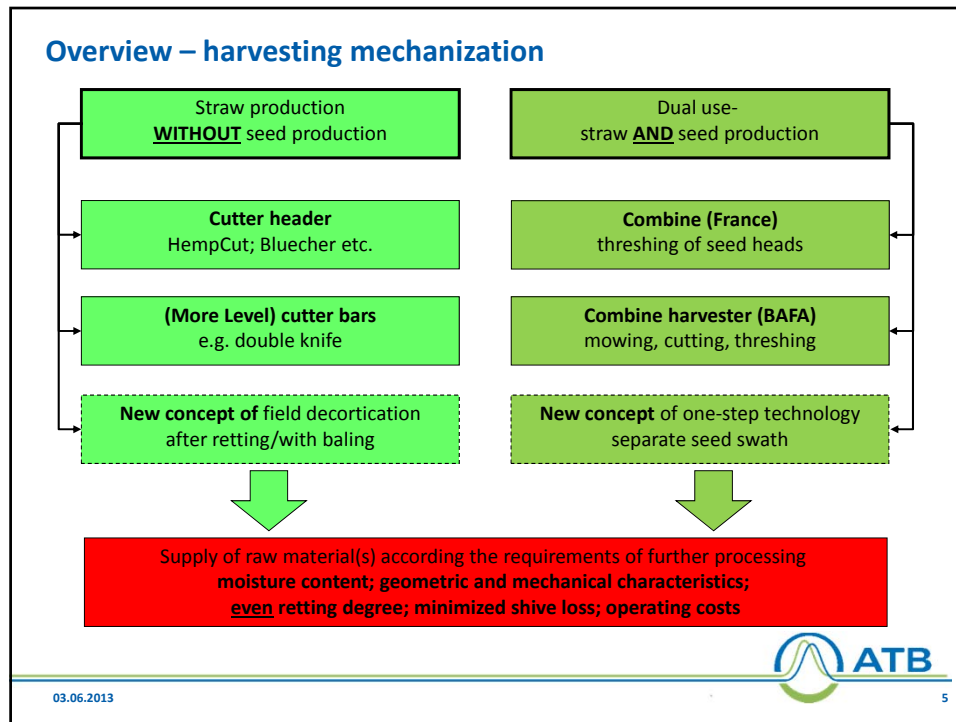


MultiHemp-task:
panicle (threshing residues)



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Mowing and stem cutting ("rotary")

Source: HempFlax

Wittrock Landtechnik

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- operating costs
- Drying/retting behaviour
- problematic under hard field/plant conditions (plant height up to 3,0 m, share of laying plants app. 50 %)

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Mowing and stem cutting ("oscillating")



Quivogne
Source: Wikipedia (by Aleks)

- Increasing acreage capacity: costs, efficiency



Clipper 4.3 * (by Tebeco)

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Swath turning



Pulled belt swather ROC - 950

- Working width: 9,50 m
- Working speed: 6 ... 9 km/h
- Capacity: up to 5,5 ha/h
- swathing of wide stacked hemp, moved with HMG 4-5000
- clearly improved working quality in regard to contaminations



© Murray & Braham

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Mowing and stem cutting ("oscillating")



© Wilson Contractors



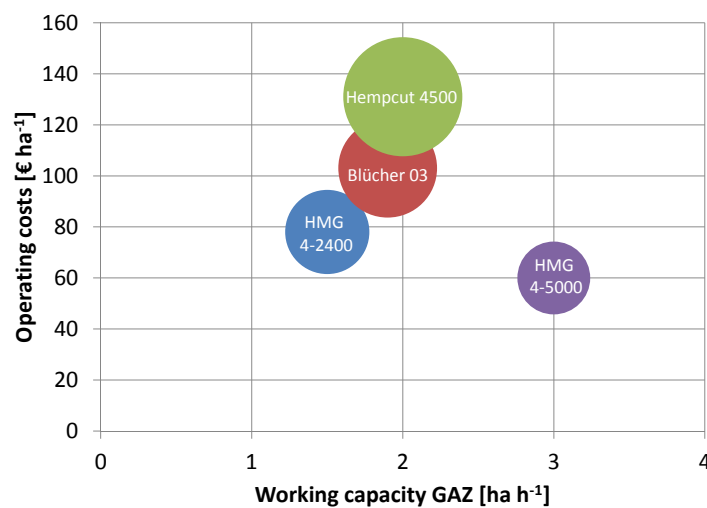
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Capacity and operating costs



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Harvesting for textile applications

(Gruppo Fibranova, IT)



2007 prototype of a front-headed hemp harvesting device for controlled swath stacking of stems in parallel position (further handling for textile processing)

designed and manufactured by  **Kranemann**



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Field decortication

MOWER CONDITIONER (Canada):
Non-Contact Intermeshing Steel V-Bar
Conditioner Rolls



© Construire en Chanvre

? Prolonged transport distances
and increasing costs
? Field retting and drying
? Value added for farmers
⊗ Shive loss



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Dual Use – Hempseed harvesting by traditional combine



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© Jean-Phi

- More or less adapted combines
- "Hillmaster" or other high cutting possibilities
- Simple mower bars for harvesting of remaining stems

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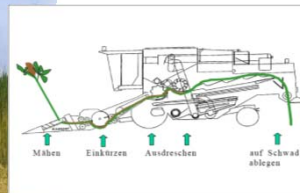


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Dual Use – Hempseed harvesting with special combine of BAFA (Deutz-Fahr, Götz GmbH)



© LTZ Augustenberg



First field trials 2000/2001:

(Source: Mostel 2002)

- Working width: 4,50 m
- Stem cutting to pieces of 60 cm
- Swath width: 1,20 m
- Working speed: 3 ... 4 km/h
- Capacity: up to 1.9 ha/h
- Seed loss: 20 ... 40 %
- Increased stem "injuries"



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Dual Use – further developments for Hempseed harvesting



Prototype developed by
Polish institute
© INF Poznan



Prototype developed by
Swedish farmers
© Hampekraft AB, Pajse Maskin AB, Gotlands
Industrihampa AB

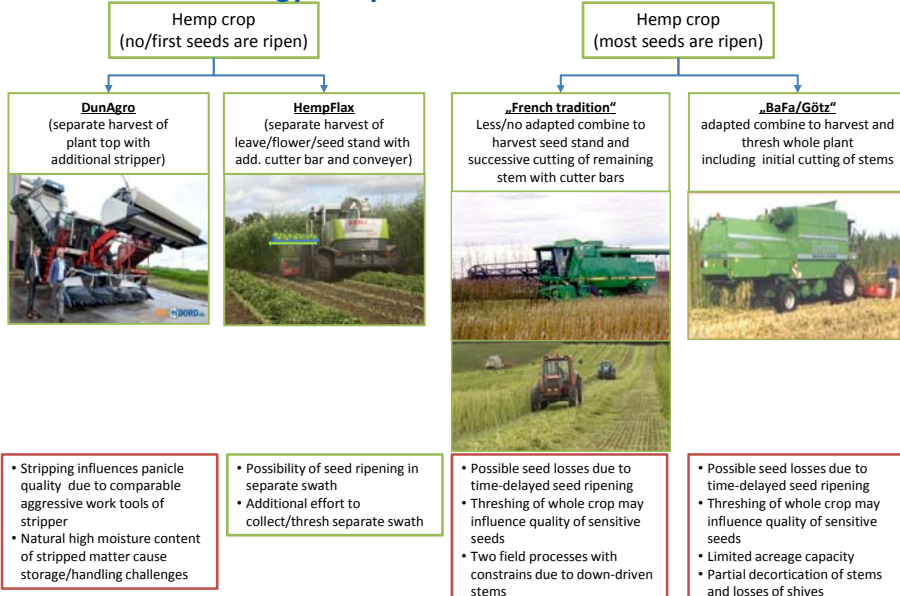
Prototype developed by John Deere
© Trait d'Union Paysan



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Dual Use – technology comparison



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Summary and outlook

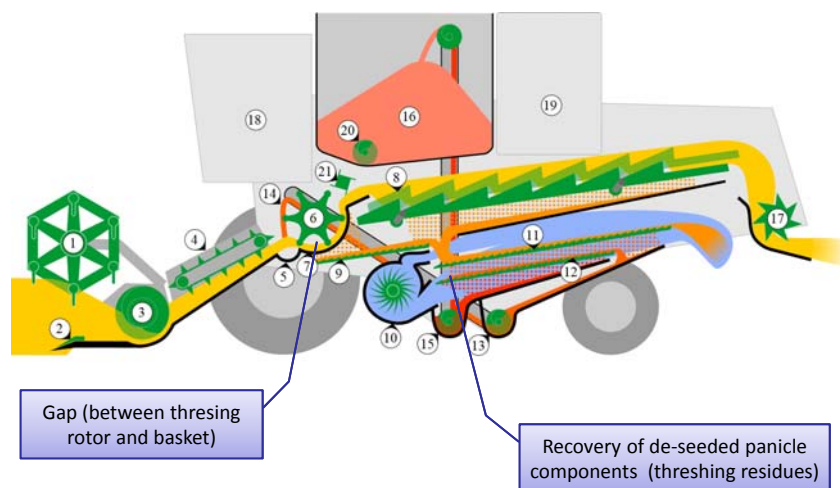
- ✓ Established process technologies and machines available world wide
- ✓ Traditional utilization of combines does not consider special (pre-)condition of seed ripening of hemp under (North-) European climate condition
- ✓ Harvest of separate plant portions (e.g. in extra swath) is considering delayed ripening, but requires second phase of harvest
- ✓ Simultaneous stripping of plant top requires immediate and intelligent handling of this plant portion (moisture content)
- Design and development of simple (tractor pulled) device to allow de-seeding while crop necessarily is raked/swathed

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Combine utilization - challenges



Source: Wikipedia (by Hans Wasthuber & Tucvblif)

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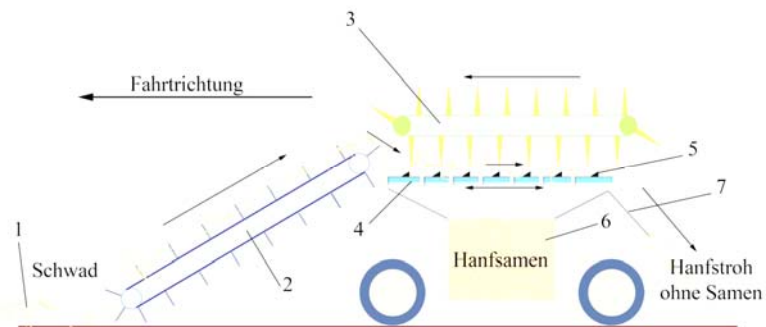


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Adapted process technique for swath de-seeding



- A cooperation project of ATB and Kranemann GmbH



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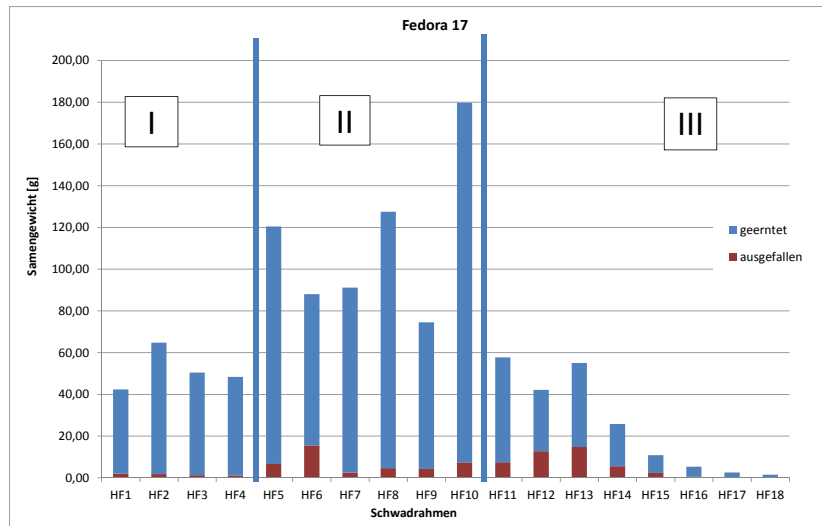
Experimental swaths with bird protection cover



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Amounts of harvested and „lost“ seed from swath (Variety Fedora 17)

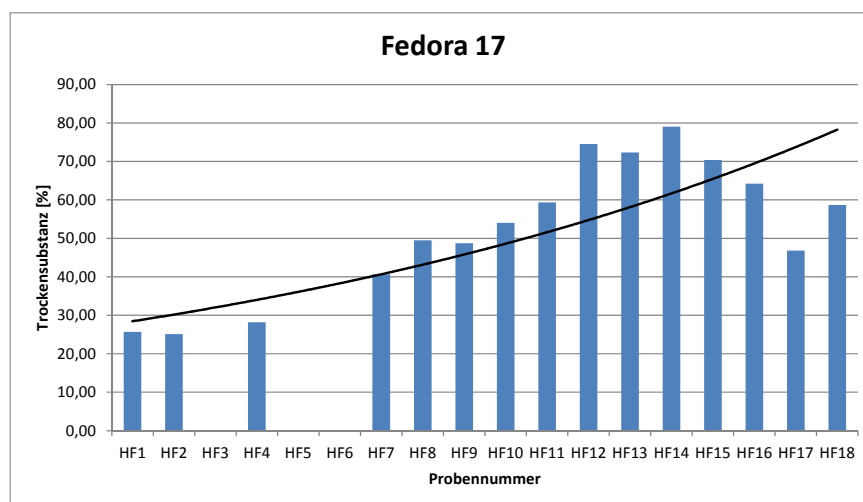


23.05.2012



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Dry matter content of seeds during test period (Variety Fedora 17)



23.05.2012



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Thank you



H.-H. Kranemann / B. Stezenko
Kranemann GmbH
Hof 2 / D - 17194 Blücherhof
phone: +49 (0) 39933/ 71 908
fax: +49 (0) 39933/ 71 910
email: kranemann.bluecherhof@t-online.de
url: <http://www.Kranemann.org>



Dr. H.-J. Gusovius / C. Lühr
Leibniz Institute for Agricultural Engineering Potsdam-Bornim
Department of Post Harvest Technology
Max-Eyth-Allee 100 / D - 14469 Potsdam-Bornim
phone/fax: +49-(0)331-5699-316 /-849
email: hjgusovius@atb-potsdam.de
url: <http://www.atb-potsdam.de>

