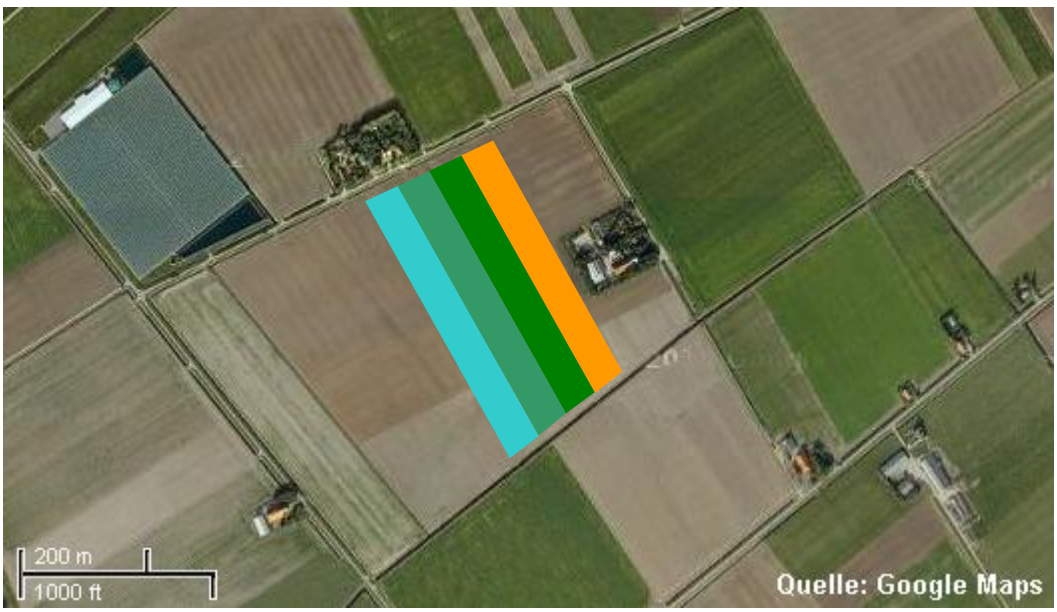
Intelligent crop production

Active Farming

3C – the crop establishment concept

Hellevoetsluis (NL) trials site



Overview of the results

System techniques

Details

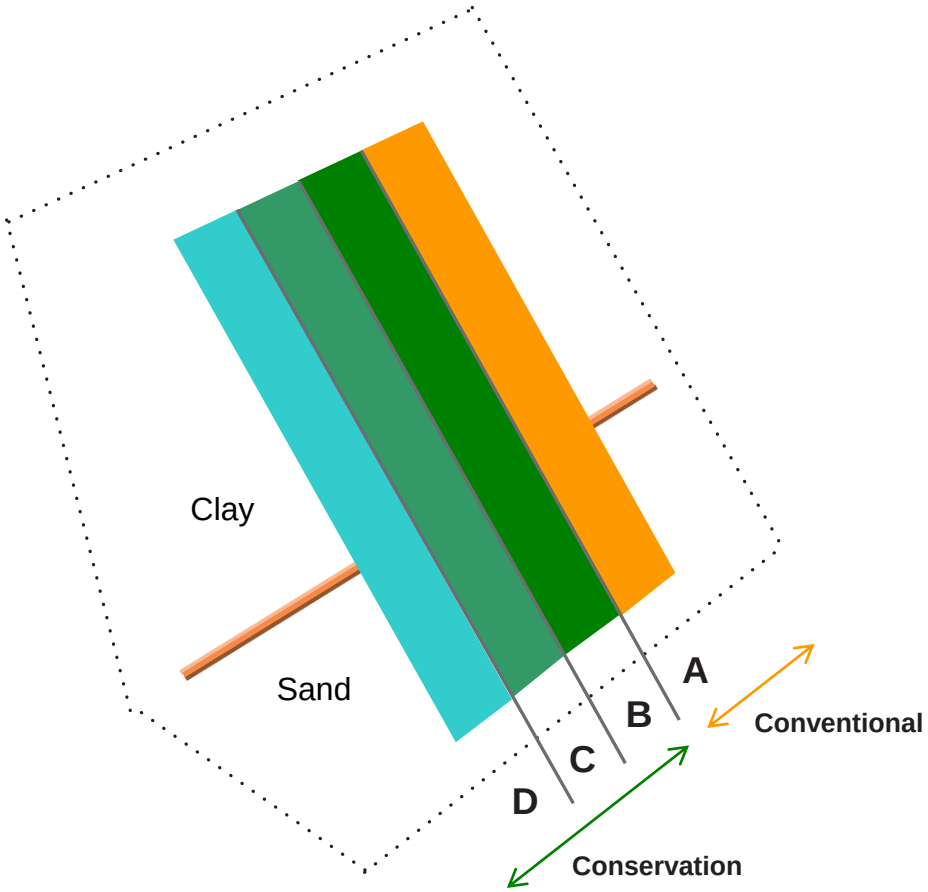
AMAZONE

Overview of the results: Hellevoetsluis (NL) trials site

Aim of the trials:

Is a soil structure protecting, cost saving system technique sustainable for the heavy Polder and slit soils found in the Netherlands?

Trials structure:



Plot D	Plot C	Plot B	Plot A
Mulch sowing 22 cm*	Mulch sowing 15 cm	Mulch sowing 22 cm	Plough 25 cm

The estuary area found in the southwest of the Netherlands is made up (compared with German marsh areas) from heavy, clay soils. There are though, additionally, now and then, zones of sandy origin found in the river flood plains. Both apply to the Hellevoetsluis trials site.

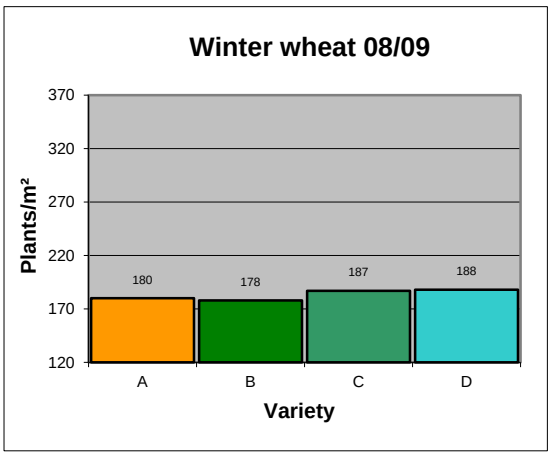
The layout of the trials mirrors the classic structure of all AMAZONE's trials work. For the basic soil tillage conventional techniques are compared with conservation systems. The plots following the conservation tillage techniques are worked at differing levels of intensity. On the basis of the prevalent conditions at this location, the shallow soil cultivation was dropped and replaced by a typical farm Variant using a subsoiler instead.

The crop rotation of winter wheat, winter barley, winter rape is untypical for this region where normally a crop rotation containing a high proportion of root crops dominates. However, this untypical crop rotation makes it easier to compare directly with the trial results from German marsh land locations with a similar crop rotation.

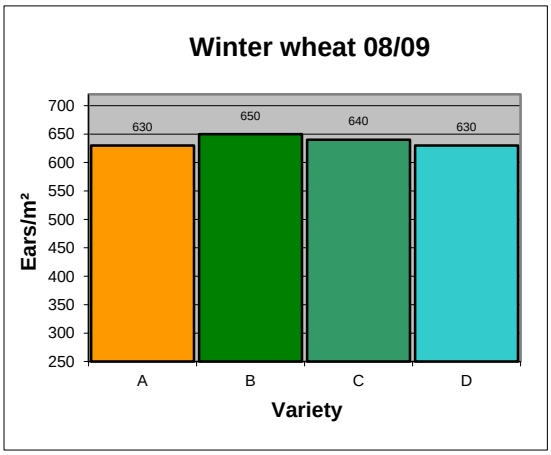
The demands of this location for sowing make it possible to use only powered seed drill combinations, which is why the use of passive sowing technology was disregarded.

Trials results 08/09:

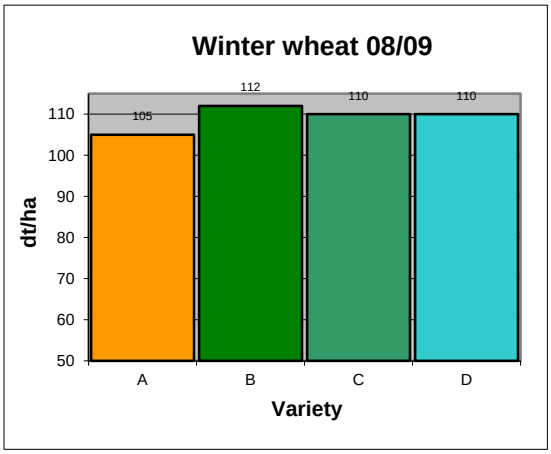
Plant emergence



Crop density

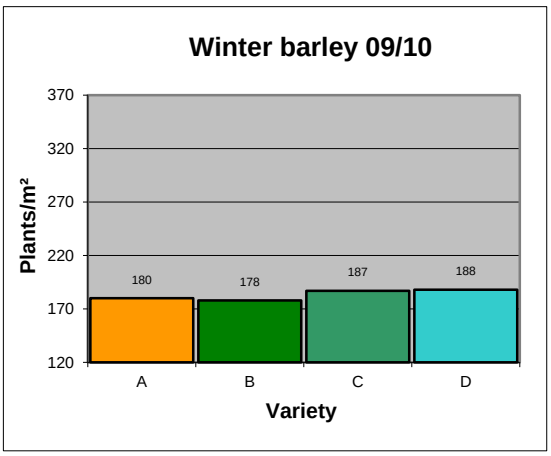


Yield

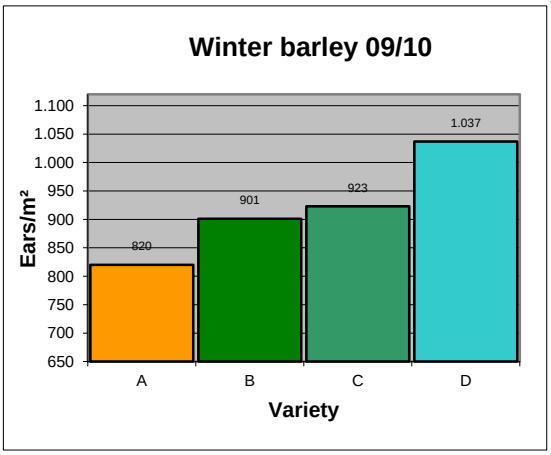


Trials results 09/10:

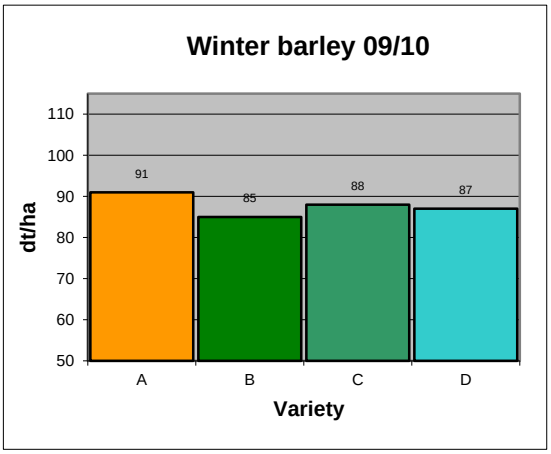
Plant emergence



Crop density

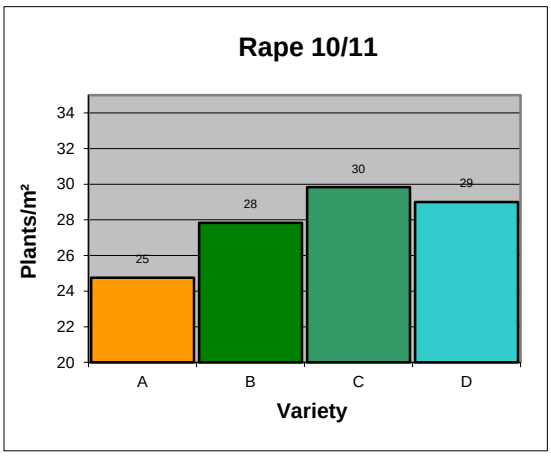


Yield



Trials results 10/11:

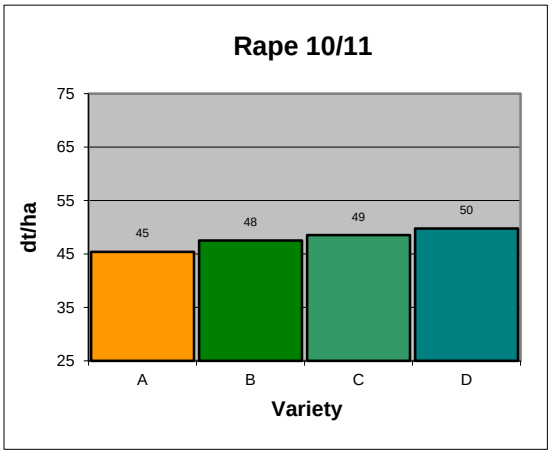
Plant emergence



Crop density

Data not collected
in this trials year!

Yield



System techniques: Hellevoetsluis (NL) trials site

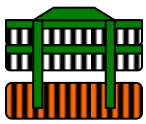
Trial plots for tillage, seedbed preparation and sowing

	Plot A Plough 25 cm	Plot B Mulch sowing 22 cm	Plot C Mulch sowing 15 cm	Plot D Mulch sowing 22 cm*
Stubble working	Catros, working depth 6 cm			
Tillage	Plough 25 cm Catros	Cenius 22 cm	Cenius 15 cm	Deep loosener 22 cm
Seedbed and sowing	KG - AD-P Super			

decreasing tillage intensity

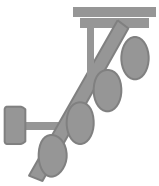
* farm's usual cultivation with a deep loosener

Stubble cultivation



Catros in A, B, C & D

Soil tillage



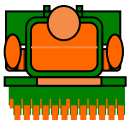
Plough in A

Cenius in B & C

Subsoiler in D

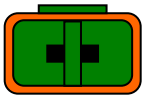
(Catros in A after the plough)

Sowing



AD-P Super in A, B, C & D

Fertilisation



ZA-M in A, B, C & D

Crop protection

UF in A, B, C & D

AMAZONE trials at Hellvoetsluis (Netherlands)

The Hellvoetsluis trial site (30 km to the southwest of Rotterdam) is characterised by extreme soil and climatic conditions. The clay content of the soil, a young, heavy lime marsh, varies between 30 and 60 %; the pH value is above “7” and the humus content about 5 %. These are ideal conditions for field trials for the sustainable establishment of soil saving, cost saving and conservation arable farming methods.

Due to its composition and properties, the soil can bear mechanical loads and tends hardly to suffer any structural damage, such as soil compaction damage. Its distinctive swelling and shrinking behaviour ensures a good oxygen supply in arid conditions in the summer half-year is, however, at the same time the cause of an oxygen deficiency in moist conditions in the winter half-year.

The latter defines the required tillage intensity. The high rainfall level of about 900 mm/year is finally decisive for the necessity of intensive soil loosening. According to the first estimations, working depths must be between 15 and 30 cm. It is rather unlikely that successful tillage is possible at working depth of 10 cm and less.

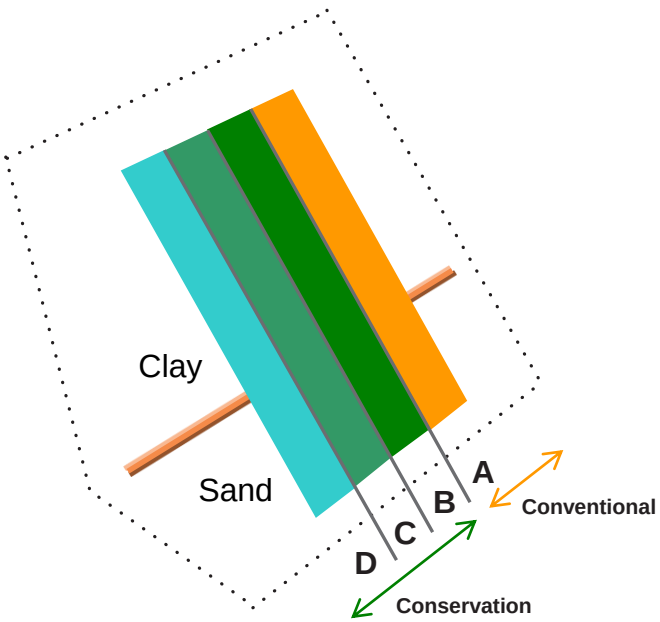
The trials setup
Matched to the general trials set-up, AMAZONE has investigated in Hellevoetsluis since autumn 2008, the different soil tillage methods with the plough and the use of a cultivator at decreasing working intensity (blocks A – D).

Due to the heavy soil conditions the otherwise usual version with 8 cm working depth is not investigated. For this purpose the so far on the trial farm, their usual variant of working with a deep loosener was integrated into the trials.

Similar applies to sowing technology. Due to mostly moist conditions during sowing and the related, rather coarser seedbed structures the use of passive sowing technology has been abandoned. The sowing operation is carried out in a classic way and site specific with an active PTO-driven sowing combination.

Site data	
Soil	Lime marsh
Climate	Annual rainfall 900 mm, average temperature: 9.4°C
Crop rotation	Winter wheat, winter barley, winter rape
Tramline width	39 m

Layout of the trials site on the farm of Hans van Strien in Hellvoetsluis



Plot A is worked conventionally with the plough, whereas plots B, C and D follow a min-till conservation tillage regime.

Trial results in an overview:

The difficult trial site in Hellevoetsluis requires increased intensity, both in soil tillage and when sowing. In most years, the soil must have the possibility to aerate and dry.

The winter oil seed rape in 2011 brought about the completion of the full crop rotation for this site.

After the run-through of a complete crop rotation, the yield results show that this site can also support conservation systems. However there is no distinct preference in the favour of a specific version.

Even though the crop rotation for the Hellevoetsluis site is rather untypical, the results are very interesting. They can also be transferred to German marsh sites.

Trial plots for tillage, seedbed preparation and sowing

	Plot A Plough 25 cm	Plot B Mulch sowing 22 cm	Plot C Mulch sowing 15 cm	Plot D Mulch sowing 22 cm*
Stubble working	Catros, working depth 6 cm			
Tillage	Plough 25 cm Catros	Cenius 22 cm	Cenius 15 cm	Deep loosener 22 cm
Seedbed and sowing	KG - AD-P Super			

decreasing tillage intensity

Yield results (dt/ha) in comparison

	Plot A Plough 25 cm	Plot B Mulch sowing 22 cm	Plot C Mulch sowing 15 cm	Plot D Mulch sowing 22 cm*
Winter wheat 08/09				
Seed rate seeds/m²	320 (variety Anthus)			
Seedling emergence (plants/m²)	180	178	187	188
Crop density (ears/m²)	630	650	640	630
Yield dt/ha	**105**	**112**	**110**	**110**
Winter barley 09/10				
Seed rate seeds/m²	224 (variety Wintmalt)			
Seedling emergence (plants/m²)	180	178	187	188
Crop density (ears/m²)	820	901	923	1.037
Yield dt/ha	**91**	**85**	**88**	**87**
Rape 10/11				
Seed rate seeds/m²	52 (variety Visby)			
Seedling emergence (plants/m²)	25	28	30	29
Yield dt/ha	**45**	**48**	**49**	**50**

* farm's usual cultivation with a deep loosener

The yield results were determined in co-operation with PD Dr. Voßhenrich from vTI Braunschweig

Comment on trials results in Hellevoetsluis

by Dr. Sven Dutzi, AMAZONEN-WERKE

After the rape harvest in 2011, the three-year trials results are now available. From the trials results of, for this region, the untypical crop rotation of winter wheat – winter barley – winter rape – no clear advantages in favour of a specific system can be derived.

It would seem, once again, that even heavy, moist and heterogeneous locations (see layout of the trials site) are workable with conservation tillage techniques. The yields are stable over the monitored period and at a high level. From the start though, it is obvious that there is only the choice of using deeper soil tillage and sowing systems with a higher level of intensity. Minimal conservation tillage techniques at this sort of location need to be disregarded sooner and also, from the outset, the use of passive sowing technology should not be contemplated for some years.

Besides the yields, the costs of cultivation play a major role. Here the systems of reduced soil tillage clearly perform more favourably. This applies especially with regard to fuel consumption and operational time.