Non inversion tillage systems in organic farming: an option for the UK farmer – Study tour to Romania, 3-5 Oct 2008

Stephen Briggs, Andrew Charlton (Abacus Organic) and Phil Hitchman undertook a study trip to Romania from 3-5 Oct 2008, organised by IOTA, to look at the min till system developed by Friedrich Wenz in Germany.

The farm is located in the west of Romania 1 hr south of Arad on the Hungarian Border. The land is gently undulating on silty clay loam soils.

The farm operates three 3-3.8m Wenz '*Eco-Dyn'* machines on a 600ha organic farm. The Swiss family who own the Romanian farm have amalgamated over 1000 small farms to create one 600ha organic stockless arable farm. They have been farming the land for 6 years and employed the '*Eco-Dyn'* machines from the start.

What was immediately notable from the trip was that (a) there are hundreds of thousands of hectares of land in Romania that is excellent agricultural land that is not being cultivated as it has reverted to a mixture of scrub/brambles/grasses.

(b) farms are generally very, very small (1-2ha) or huge (40-50,000ha) and (c) winters (Nov-April) are very cold, reaching 10-20 below freezing and summers are hot and dry (30-40 deg).

As a result, crops are ready for harvest in July/early August and cultivations/ drilling can be undertaken in Sept/Oct with a fair degree of certainty. When we visited in early Oct it was 20deg C.

The simple system operated by the farm operates on the basis of 2 year white clover (no grass inclusion) fertility building phase followed by a rotation of (1) wheat, (2) oats, (3) spelt, (4) lupin/soya, (5) rye/barley, (6) sunflower in that order.

During the clover fertility building phase the clover is cut and mulched 2-3 times in the season. This is achieved with a mower and 30-40 deg C summer temperatures help desiccate the clover, which worms then incorporate in the soil. At the end of the clover fertility building phase the clover is cultivated once with heavy discs in Sept/Oct to level fields and penetrate the soil surface.

This is followed by one pass with the *Eco-Dyn* machine fitted with discs/ shares to a dept of c.5cm. After approx 2 weeks, a second pass with the *Eco-Dyn* machine is undertaken at c.5cm with shares and drill points with drilling of cereals undertaken at the same time.

After crop emergence, the crop is weeded with a comb harrow, one in the late autumn. The next operation is harvest.

No fertilisers, manures or composts are added to the soils. pH levels are c. pH 7.0 and P & K reserves are adequate.

We did not get to see the *Eco-Dyn* multibox seed drill system. The farm operates the *Eco-Dyn* with a comb harrow seed box and larger hopper mounted on the *Eco-Dyn.* This seems adequate for their requirement at the moment.

The system produced reasonable, but not exciting, yields in the region of 2.5 – 3.5t/ha, using two non powered cultivators and a single 12m weeder, offering a radical alternative to the plough.

Weed levels were moderate on the farm with lots of knotgrass and general grass weeds and a fair level of brambles still present. While annual and perennial weeds were undoubtedly present, it was difficult to judge the long term impact of the system on weed levels, but from our visit it looked like they are clearly being well contained with the system.

It should be noted that the purpose of the large, heavy discs was to (a) level the land as there was lots of undulation between the smaller previous strips of land in different ownership and (b) to help penetrate the hard dry soils in late summer. The farm anticipates that it will be able to stop using the discs as the fields become more level and as increased soil organic matter improved workability.

We viewed the machine operating as a cultivator and rode on the back of the tractor whilst it was working. What was notable was that forward speed was fast (15+km/hr), working depth was shallow, there was a high degree of soil mixing

in the cultivated layer (5cm) and at the surface, and weeds were undercut with near 100% coverage of the soil by the shares.

As with the visit to the Wentz farm in Germany, we found there was a thorough understanding of what an organic system is really about – and putting that into practice with some rather novel kit. The farm has a dedicated focus on maximising soil fertility, organic matter build-up and feeding the soil life while avoiding all bought-in mineral fertilisers and manures. A focus on maximum production from minimum energy was a driving force for the farm, as on 600ha energy was a major issue. Its overall energy requirement is judged to be significantly lower than that for the standard plough and cultivator system.

There has been very little detailed monitoring of this farm and its system and as with most farms, the 'system' is still in development. There was no comparative analysis with neighbouring organic and conventional farms available.

However we did view the neighbouring farms setting out to drill their crops when departing the farm, with a 12m drill set up – x 6 50hp tractors with 2m drills mounted! - all working together in one field.

The big question for us was "will it work over here?"

Soils were very similar in nature to clay/silt based UK soils, though the Romanian soils were notably stone free. The growing conditions are, of course, very different. Cold winters and very dry summers and a big window of opportunity for desiccation and dry cultivations in August and September with a more predictable climate. We still have questions regarding the ability of the system to work in wetter soils when crops are harvested in September and need to be drilled again in October in the UK. However, provided soils can drain well only cultivating 5cm of soil and where high levels of organic matter are present and where only 2-3 passes are required, there is real potential.

One other major difference is that the farm uses 100% clover only – no grass inclusion – no animals to feed (other than earthworms!). In the UK with a more maritime climate and with grass in the system, I would be concerned about the ability to kill off the grass in a short period of time with this system. 100% clover, perhaps, a grass/clover mix – very difficult to achieve success I think.

However, the system and machinery is not a blueprint attached to a piece of kit. A detailed knowledge of the farm, its soil and cropping choices has led the Romanian farm to develop a management approach based on cultivations, cropping and green manure options to suit its localised conditions. Their system is different to that operated by Wentz in Germany, but it is an adaptation to local conditions. It does seem from Friedrich's work on his own farm in Germany that for other farms through central and Eastern Europe that local adaptations of the system can be made to work under a wide range of soil and climatic conditions.

IOTA may plan another study visit to Romania in summer 2009 to look at the results of this years planting/cropping and to further evaluate the application of the system.

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