

Plough tops yield, but not margin

The long-term effects of different cultivation systems on crop yields are starting to become clear in a major trial.

Louise Impey looks at the latest figures

Highest crop yields across all the combinable crops in a long-term trial continue to come from a plough-based cultivation system, according to the latest results from the STAR project, a rotational study being carried out in Suffolk by NIAB TAG.

However, last year's yields were affected by the dry spring conditions and grass weed pressure, says Ron Stobart, who reveals that the oilseed rape yielded 3.3-3.6t/ha, winter beans achieved 2.0-2.75t/ha and continuous winter wheat averaged 8t/ha.

"But where non-inversion tillage was used, the continuous wheats didn't fare as well," he explains. "Yields were down to 6-7t/ha, which was mainly due to weed competition. The very heavy herbicide hits needed probably had a detrimental effect too."

Margins followed the same path, with better figures coming from ploughed and deep tillage approaches. "There's no doubt that last year's dry spring really pulled them apart. On that basis, this year's results could be even more telling."

But, with the project now in its sixth year, the long-term trends show that the best margins are coming from a managed approach to cultivations, where the decision on which system to use is taken much nearer the time and is based on field conditions and soil assessments.

"That's very reassuring," says Mr Stobart. "It shows that there's no substitute for local knowledge and an understanding of relevant factors such as the weed populations and previous cropping. The

PLOUGHING

★ The better yields from the ploughing regime are not the whole story when it comes to cultivations, believes Mr Stobart. "There are workload and timeliness issues with ploughing," he notes. "It's not for everyone." He adds that shallow tillage systems often get better over time. "It may be best to stick with it and see if things improve."

The STAR project has just been granted another two years by the Felix Thomley Cobbold Trust, which funds the work.

weather has a bearing on soil conditions too."

The plough and deep tillage regimes are coming up close behind, he adds. "It's the shallow non-inversion tillage regime which is delivering the poorest performance." Part of the reason for that is the increasing grass weed burden, he notes. "They are a particular problem in the continuous wheat plots and numbers have really escalated in the last three to four years."

Both brome and blackgrass are present, creating a dilemma for control timing, he adds. "Where we've used a pre-emergence treatment followed by a post-emergence

weed seeds being lost very year, he points out. "Although you are bringing up some of the buried weed seeds when you plough, the freshest seed is being buried. It is an effective strategy."

Where brome is a problem, leave stubbles untouched after harvest, he advises. "If brome seed is exposed to sunlight and temperature fluctuations, its dormancy is broken. That makes it easier to get good control. Later drilling can also be effective, but it's seldom practical as an across the board strategy, he warns. "Drilling conditions really matter. Perhaps the best thing to do is leave the worst fields until last, rather than deciding to drill everything later."

Soil structure investigations show that rotation hasn't had any effect, says Nathan Morris of NIAB TAG. "But we have seen some implications of cultivations strategy. Where long-term shallow non-inversion tillage has been used, water infiltration rates are reduced. The soil is more dense and of a tighter nature, which has effects on surface drainage. There haven't

EFFECTIVE STRATEGY

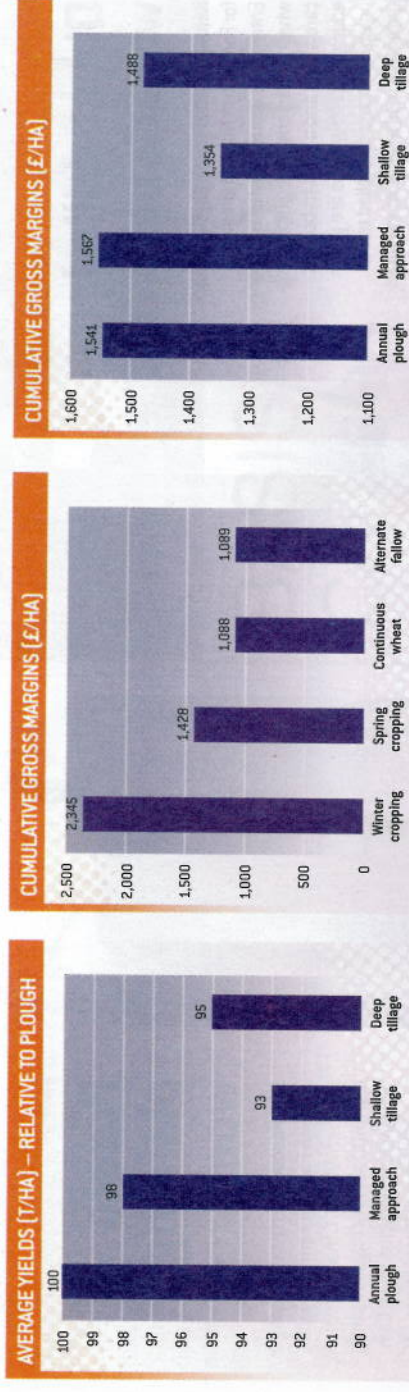
His colleague, weed expert John Cussans, believes that continuous wheat being grown with non-inversion tillage is unsustainable. "The grass weed problem gets too much. The only way to make it manageable is to use the plough."

Ploughing results in 50-60% of

THE IMPACT OF ROTATION AND CULTIVATION SYSTEM ON YIELD AND MARGIN – 2010 RESULTS

	Yield (t/ha)					Gross margin - machinery cost (£/ha)				
	Winter cropping	Spring cropping	Continuous wheat	Alternate fallow	Alternate fallow	Spring cropping	Continuous wheat	Alternate fallow	Alternate fallow	
Annual plough	3.47	2.70	8.21	-	-	486	524	-96	-96	
Managed approach	3.61	2.63	8.29	-	-	558	534	-96	-96	
Shallow tillage	3.35	2.17	6.88	-	-	531	322	-96	-96	
Deep tillage	3.55	2.13	6.96	-	-	542	322	-96	-96	
Average	3.50	2.41	7.59	-	-	529	426	-96	-96	

Prices based on wheat £130/t; beans £140/t; oilseed rape £280/t; diesel 50p/l; nitrogen 56p/kg N (AN) or 55p/kg N (liquid)



CULTIVATION TREATMENTS

Annual Plough
Decision on cultivation regime is made nearer the time and is based on soil/weather conditions, previous cropping, weed burden, soil assessments etc

Managed Approach
Treatment is cultivated to around 10cm using a non-inversion technique

Shallow Tillage
Treatment is cultivated to around 20-25cm using a non-inversion technique

Deep Tillage
Treatment is ploughed every year

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Fusarium risk

★ Like the STAR project plots, the very dry growing season is making T3 spray decisions more complex for wheat crops across the east this season.

But results from the STAR project show that cropping type and cultivations can affect the amount of fusarium inoculum around and increase risk, says TAG agronomist

Neil Watson. "Wheat following oilseed rape, spring beans or fallow is at much lower risk than crops following grain or forage maize."

Ploughing also reduces inoculum by 75%. "That's because the trash is buried. So in a high-risk situation, it makes sense to plough."

For more on T3, see p47.

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