

Pre-harvest glyphosate application to wheat and barley



Photograph: Frontier

Key points

Always check that your grain buyer accepts crops treated pre-harvest with glyphosate.

Do not treat crops being grown for seed.

Glyphosate applied pre-harvest to:

wheat controls perennial and annual weeds but is difficult to justify as a harvest aid in weed-free crops.

spring barley provides perennial and annual weed control and may aid harvest of weed-free crops.

Do not apply where a significant proportion of grain is over 30% moisture content.

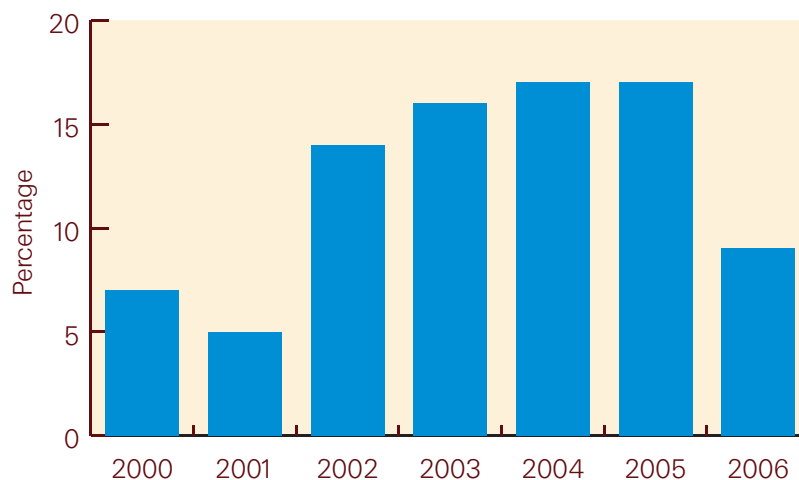
Always check manufacturer's information for any restrictions and conditions of use as well as appropriate rates.

Always consider your local conditions and consult a BASIS-qualified adviser if necessary.

Residues in bread

The Food Standards Agency promotes best practice to help minimise residues of glyphosate in bread. Reports of the UK Pesticides Residues Committee show that glyphosate residues are regularly found in bread samples (Figure 1). All residues in tests to date have been well below Maximum Residue Levels (MRLs) – see <http://www.pesticides.gov.uk/prc.asp?id=956>

Figure 1. Percentage of bread samples (ordinary and speciality) containing glyphosate residues, 2000-2006



Source: UK Pesticide Residues Committee survey

The precise incidence in home-grown milling wheat is not clear because UK bread typically contains some imported wheat. Residues monitored in ongoing HGCA project 3100 on cereals have not exceeded MRLs.

Reasons for treatment

Pre-harvest glyphosate application for cereals was introduced in the UK in 1980. The potential benefits are:

- to control weeds, notably perennials such as common couch (*Elytrigia repens*) and annual weeds
- to improve harvesting efficiency, ie as a harvest aid.

Not all cereal crops can be treated pre-harvest as some end-users impose restrictions. As with any pesticide, treatment is only appropriate if clear agronomic advantages can be demonstrated.

TAG and SAC reviewed both their own experimental results and other published data on pre-harvest glyphosate use. This review focused on winter wheat in England and Scotland and spring barley in Scotland.

Weed control

Pre-harvest use in both crops provided very effective perennial weed control and also killed any annual weeds present. Perennial weeds are typically very susceptible at this stage. A large amount of foliage intercepts the spray; then rapidly-growing roots, or rhizomes, 'draw down' the herbicide. In suitable weather conditions high levels of control were achieved.

Treatment eased harvest of weed-infested crops and was most effective when weeds were growing rapidly in moist soil.

Many farmers have applied glyphosate pre-harvest over several years; as a result, only a small crop area now requires treatment for perennial weeds. The rate of herbicide used depends on weather conditions, weeds present and infestation levels.

Treating even low populations of perennial weeds may be justified in years when soil is moist and weeds are growing rapidly. This timing also eases harvest of weed-infested crops and may reduce drying costs. However, weed-free crops should not be treated if stubbles are to be left overwinter as this seriously reduces their food value to birds.

Harvest aid

Currently, a much greater area of crop is treated with glyphosate to aid harvesting than for weed control. Benefits have been recorded in wheat and barley crops where there were sufficient weeds to delay and/or slow harvesting operations.

Wheat

Trials in England and Scotland showed no advantage - in terms of grain and straw moisture content, harvest efficiency or grain quality - where weed-free wheat crops were treated. Field trials did not fully test the impact on ease of harvest where straw remained green whilst grain was harvest ripe, as can occur in wet seasons and following some fungicide treatments.

Serious yield losses can occur when much of the grain is well above 30% moisture content. This highlights the potential risk of using pre-harvest glyphosate to 'even up' harvesting. Residues are likely to be higher if glyphosate is applied to such moist grain.

Barley

Trials in Scotland showed that pre-harvest glyphosate applied to weed-free crops reduced both grain and straw moisture contents in a range of circumstances in spring barley. Reduced sieving and threshing losses, as well as increased combine throughput were recorded. Overall, the effect enabled combining one day earlier (Table 1).

The review concluded that pre-harvest glyphosate provided benefits in the harvesting of weed-free spring barley in Scotland.

Table 1. Effects of pre-harvest glyphosate applied to weed-free spring barley crops (average results from seven trials) on various grain parameters

Glyphosate dose (kg acid equivalent/ha) [†]	0.00	0.72	1.44
% moisture at harvest	20.3	18.8	18.9
Straw and MOG* throughput (t/ha)	6.4	5.1	5.2
Separation losses (%)	2.4	2.3	1.9

* matter other than grain

† Dose may also be quoted as kg a.i./ha or L/ha

Glyphosate effects on other crops

A number of crops are potentially sensitive to spray drift from glyphosate applied pre-harvest to cereals or to set-aside. One of the most sensitive is seed potatoes - see *Glyphosate damage in seed potatoes*, AHDB-BPC (2007).

Reason for project

HGCA recently funded The Arable Group (TAG) and SAC to review the application of pre-harvest glyphosate to wheat and barley crops. The review covered trials carried out by TAG and SAC as well as information provided by Monsanto and other research published over the past thirty years. The aim was to determine the effectiveness of this treatment for weed control and as a harvest aid. The review was initiated following reports of glyphosate residues in bread.

Main findings

The work showed that pre-harvest glyphosate application controls perennial and annual weeds effectively in both wheat and barley. Replicated trials have shown no benefit to grain and straw moisture content in wheat at harvest. However, trials in Scotland on spring barley showed that grain and straw moisture content were reduced, enabling an earlier harvest.

Further information

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Pre-harvest glyphosate for weed control and as a harvest aid in cereals

Ongoing project 3100

Glyphosate damage in seed potatoes, AHDB-BPC (2007)

<http://www.food.gov.uk/>
Search for 'cropguides'

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