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Charlotte Morgan, a PhD student, shows the resistant and sensitive populations of Italian ryegrass.

# Grass weeds - a growing problem on Irish tillage farms

The recent Enable Conservation Tillage (ECT) project aimed to inform farmers, who wish to transition into reduced cultivation systems, about one of the potential pitfalls: uncontrollable grassweeds

In the past, some growers who dabbled in min-till, direct drill or no till and were unsuccessful. Many identified the difficulty of controlling of grass weeds as one of the primary reasons for reverting to plough-based systems.

The Enable Conservation Tillage project highlighted a number of monitor farmers who had successfully made the change. One of the big learnings from the project was that the establishment system is only part of the puzzle, more IPM tools must be incorporated into the farm system for the practice change to work.

As many of the growers commented: "The drill is only the final part of the jigsaw". Good rotations, avoiding compaction, learning from mistakes and reducing grass weed problems through cultural control as well as herbicides are all important parts of a successful transition.

At the start of the project there was reluctance to acknowledge that a particular farm had a grass weed issue, especially when it came to blackgrass. We came across many cases where growers were in denial or simply didn't recognise that blackgrass was present on their farm. It was becoming increasingly clear, however, that herbicide effectiveness was starting to fail.

## Blackgrass

In Teagasc Oak Park we have seen that blackgrass can become an issue unless you are vigilant. In 2020, as part of a plan to increase biodiversity on the farm, wild flower margins were planted. Brendan Burke, the farm manager, identified blackgrass plants in one field.

A plan was put in place to eliminate the blackgrass. Glyphosate was used to burn off the affected margins, multiple stale seed beds were applied and the margin in question was ultimately planted with grass.

Italian ryegrass is another grass weed that is starting to become an issue on many farms. The problem can be traced to the autumn of 2018 when tillage farmers were paid to establish forage crops after harvest to produce much need forage for livestock farms.

Some of this Italian ryegrass has now become a problem with many herbicides struggling to control it. In the summer of 2023 a group of farmers who are participating in a European project called IPMworks visited Denmark where Italian ryegrass has overtaken blackgrass as the main grass weed problem. With no herbicide control available, their only option is cultural control methods such as whole crop, land swapping or crop destruction.

## ECT monitor farm

On all of the ECT monitor farms, farmers have used IPM techniques to control grass weeds. These include crop rotation, spring cropping, grass margins, delayed sowing, rogueing, increased seed rates, stubble cultivations, stale seed beds, crop destruction ploughing and herbicide resistance testing to control grass weeds.

The last part of the IPM toolbox that they use is a herbicide, as we have seen over the course of the project, more and more populations of the various different grass weeds are becoming resistant.

Other problem weeds that have been discovered over the last few years include herbicide resistant wild oats, rat's tail fescue and even some meadow grass resistance. Trying to control grass weeds with herbicides alone is a very risky strategy.

## A worrying trend

The latest two-year compilation of herbicide resistance test results reveals a worrying picture. It shows 68 out of 112 (61%) grass-weed populations resistant to a wide range of herbicides. These were the samples suspected of herbicide resistance submitted by growers/advisors from the 2022 and 2023 harvest.

The resistance spectrum, and distribution, of resistant grass weeds from the two harvest are presented in Table 1 and Figure 1.

- 22 out of 24 Italian ryegrass populations tested were ALS-resistant, and 14 of those were also ACCase-resistant
- 16 out of 21 blackgrass were resistant, of which 11 were ACCase and ALS-resistant, 4 were ACCase-resistant only and 1 was ALS-resistant only
- 19 out of 30 spring wild oats were ACCase-resistant
- 10 out of 11 meadow grass were ALS-resistant
- Out of 26 brome populations tested, no full resistant brome was found.

Herbicide resistance has clearly increased since the 2019 to 2021 tests (Figure 2). This is concerning when you consider the changing climate and other challenges facing the industry.

Growers should note that these challenges are not limited to resistance-prone Italian ryegrass, blackgrass or spring wild oats; meadow grass species, considered lower priority weeds, can also succumb to resistance development where late post-emergence control is relied upon.

Farms with a heavy reliance on spring herbicides or practicing 'one product for all' weed control pose a high-risk and require urgent change in crop/weed management practices to continue to stay in tillage crop production.

| | Population samples (2022-2023) | | ACCase modes of action (Full label rate) | | | | ALS modes of action (Full label rate) | |
|---|---|---|---|---|---|---|---|---|
| | Tested | Resistant | Axial | Falcon | Stratos | Centurion | Pacifica | Broadway |
| Italian ryegrass | 24 | 22 (92%) | R | R | R | R / S | R | R |
| Blackgrass | 21 | 16 (76%) | - | R | R | R / S | R | - |
| Spring wild oats | 30 | 19 (63%) | R | R | R | - | S | S |
| Bromes | 26 | - | - | S | S | - | S | S |
| Annual meadow grass* | 9 | 8 | NT | NT | NT | S | R | - |
| Rough meadow grass* | 2 | 2 | S | S | S | S | R | - |

*NT – naturally tolerant or resistant; R – resistant (>20% plant survival); S – sensitive*
**Chemical control options are not usually listed on the product label*

**Table 1. Grass-weed sensitivity screening results from the 2022 and 2023 harvest**

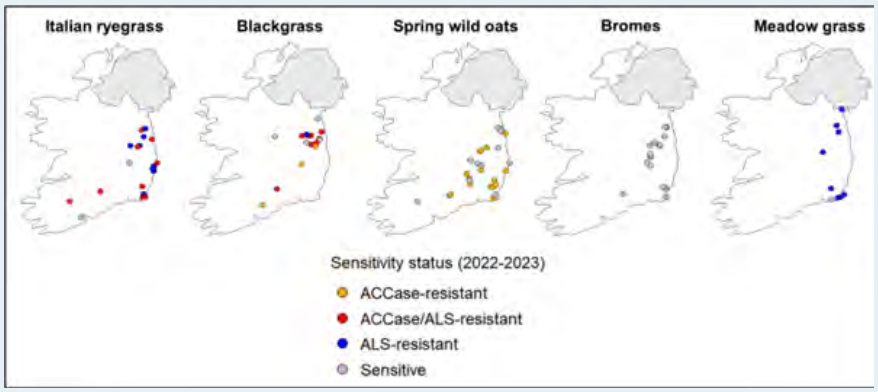


**Figure 1. Distribution maps for resistant and sensitive grass weeds from the 2022 and 2023 samples**

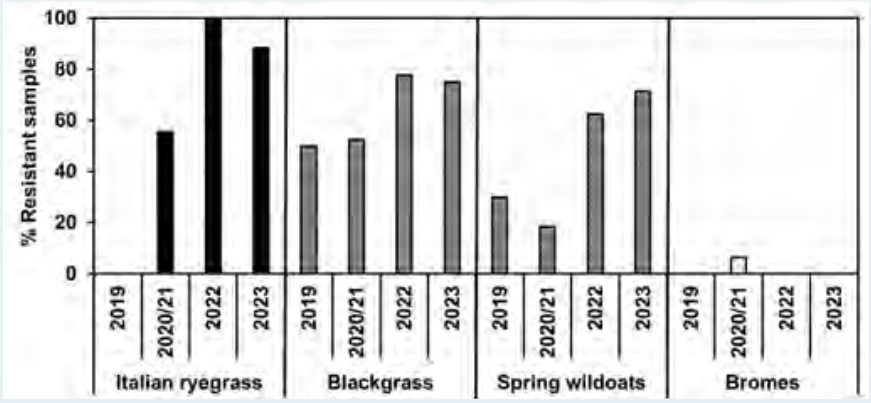


**Figure 2. Percentage of resistance detected in Italian ryegrass, blackgrass, spring wild oats and bromes from samples taken from 2019 to 2023. Note: 2020/21 tests include both industry-submitted samples and samples collected as part of the nationwide grass-weed survey.**

## Steps to take

- Identify weeds correctly at all growth stages.
- Adopt integrated weed management including cultural/non-chemical approaches
- Rotate herbicide modes of action
- Use robust rates of glyphosate in stale seedbeds
- Stack or tank mix residual herbicides
- Use spring herbicides as a tidy up only for grass weeds – not as the only measure.
- Avoid importing weed seeds by adopting stringent machinery hygiene and biosecurity measures.
- Take decisive one-off actions such as crop destruction, ensilage or sowing down to a grass ley to avoid the consequences of competitive resistant weeds becoming established.
- Use the Oak Park testing service, which is currently free as part of the DAFM-EVOLVE project to test suspected resistant weeds; grass or broad leaved. Testing will inform you which herbicides will still work and what actions to take to contain the problem. The resistance testing form and seed collection instruction is accessible via., https://bit.ly/3MrlcgR or scan the QR code below. Your advisor will have all the details too.