Project number: 5376
Funding source: Teagasc
Date: Sept, 2012
Project dates: Jan 2005 - Dec 2007

Agronomy of triticale under Irish conditions

Key external stakeholders:

Cereal growers, advisers and agronomists, livestock producers

Practical implications for stakeholders:

Triticale has the potential to be a reduced-input alternative to winter wheat as a source of grain and whole-crop forage but relatively little work has been carried out on its agronomy under Irish conditions. This work has shown that under Irish conditions

- Triticale can be grown with lower inputs of fungicides but the requirement for other inputs, such as fertiliser N, seed rate and take-all seed treatment is similar to that of winter wheat.
- Whole-crop forage and grain yield of triticale is similar to or greater than that of winter wheat but forage and grain quality can be lower. In particular triticale is susceptible to pre-harvest sprouting.

Main results:

Triticale can produce grain yields comparable to or better than winter wheat under Irish conditions but grain quality can be lower.
The majority of currently available cultivars are prone to pre-harvest sprouting.
Triticale can outyield winter wheat in take-all situations in the absence of Latitude seed treatment but still responds to the application of Latitude
Triticale can achieve forage yields higher than that of winter wheat but the feeding value can be lower.
Triticale has a lower response to fungicide dose than wheat suggesting that lower fungicide inputs are required.

Opportunity / Benefit:

While triticale has the potential to give higher grain yields than winter wheat, often with a reduced requirement for fungicides, pre-harvest sprouting can reduce the value of triticale grain produced.
Triticale can be used as a source of whole-crop forage, or for crimping of immature grain, which avoids issues with pre-harvest sprouting.
Triticale is particularly suited to sites where there is a high risk of take-all as it can outperform winter wheat but will give economic responses to Latitude seed treatment in these situations.
The results have been incorporated into Teagasc advisory recommendations for triticale production.

Collaborating Institutions:

None

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External collaborators: None

1. Project background:

Triticale, the product of a cross between rye and wheat, could have the potential to reduce unit production costs of grain in Ireland in certain circumstances. It has greater disease resistance than wheat and is also thought to be more suited than wheat to lighter and more marginal soils and to take-all prone sites. There is increasing grower interest in triticale. However, very little research has been carried out on the agronomy of triticale under Irish conditions. This project aimed to study aspects of triticale production, including seeding rates, fertiliser N inputs, suitability to take-all prone sites relative to wheat and its response to fungicide. Its suitability as a whole-crop forage and the potential of new varieties were also examined.

2. Questions addressed by the project:

How does grain yield and quality of triticale compare to that of winter wheat in productive soils in Ireland?
Is triticale less susceptible to take-all than winter wheat?
Does triticale respond to Latitude seed treatment?
How does the whole crop forage yield of triticale compare to that of winter wheat?
Does triticale need less fungicide than winter wheat?
Does triticale have a lower N requirement?

3. The experimental studies:

A range of field trials were carried out between 2005 and 2007 at Oak Park Research Centre. Trials compared the grain yield and forage yield of winter triticale with that of winter wheat grown with the same input levels. Trials also compared the response to fungicide and fertilizer N inputs of winter triticale compared to winter wheat, and the response to Latitude seed treatment of triticale and wheat. A comparison of the agronomic characteristics of a range of new varieties as well as trials comparing the effect of seed rate on triticale yield was also carried out. Trials were for the most part carried out on productive, moisture retentive soils.

4. Main results:

Winter sown triticale has the potential to produce significantly higher forage and grain yields compared to winter wheat under Irish conditions. This yield advantage of triticale occurred even on deep moisture retentive, productive soils. However both forage quality, as indicated by the proportion of grain present in the forage, and grain quality, as indicated by hectolitre weight, of triticale can be lower than that of winter wheat. The forage quality of triticale could be increased by increasing the cutting height thereby reducing the amount of straw in the whole-crop silage. When pre-harvest conditions were poor grain quality of triticale can be further compromised by pre-harvest sprouting.

A comparison of a range of seed rates suggested that the optimum seed rate for winter sown triticale was similar to that recommended for winter wheat (250-400 seeds/m^2 depending on soil conditions at sowing).
When grown in high take-all risk slots (second cereal after a break crop) triticale had the potential to significantly outyield winter wheat where seed treatments effective against take-all were not used. However, despite its lower susceptibility to take-all, triticale still gave an economic response to treatment with Latitude seed treatment when grown in a high take-all risk slot.

Comparison of the response to fertilizer N of winter triticale and winter wheat suggested that grain yield of both responded similarly to fertilizer N. This suggests that fertilizer N recommendations for winter wheat can be used for winter triticale. However there is a greater risk of lodging with triticale as the rate of fertilizer N applied increases and therefore where a cultivar susceptible to lodging is being grown fertilizer N inputs to triticale should be reduced by ~10% compared to what would be recommended for winter wheat in a similar situation.

Triticale gave a lower response to fungicide (comparing no fungicide with half-rate fungicide input) than winter wheat cultivars with which it was compared, even when compared to wheat cultivars with a high degree of disease resistance. It generally gave no response to increasing fungicide inputs from approximately half label rate to full label rate. If the area of triticale grown was to increase significantly fungal disease may become more prevalent on the crop and fungicide requirements may then need to be

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reevaluated.

A comparison of a range of new varieties suggested that there was considerably variability between varieties in terms of grain yield, height and lodging resistance. Varieties with relatively short stiff straw with good yielding ability could be identified. However in a poor harvest year all varieties were susceptible to pre-harvest sprouting, which remains a significant deterrent to the use of triticale as a grain crop under Irish conditions. Before triticale is grown on a larger area an ongoing and more rigorous evaluation of cultivars would be required.

5. Opportunity/Benefit:

The results will support growers and their advisers in the decision making process regarding various aspects of triticale cultivation in Ireland. It will allow more efficient production of triticale whole-crop silage and provides an overview of the potential risks associated with triticale grain production in Ireland.

6. Dissemination:

Hackett, R. and Burke, J.I. (2004) Potential for Triticale in Low Cost Production Systems. Proceedings National Tillage Conference pp88-102 Teagasc, Carlow.

Hackett, R. 2006 Investigations into aspects of the agronomy of triticale under Irish conditions. Oak Park Crops Research Centre Research Report 2006 pp 32-33.

Hackett, R. 2007 Investigations into aspects of the agronomy of triticale under Irish conditions. Oak Park Crops Research Centre Research Report 2007 pp 16-17.

Experiments with triticale were regularly exhibited during open days and farmer visits to Oak Park Research Centre during the course of the project.

Results have been incorporated into Teagasc advisory recommendations for triticale production.

7. Compiled by:

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