



## Submissions for Diagnostic Protocols

### I. General information

<b>Submission number</b>	2023-010
<b>Title of Proposal</b>	<i>Alopecurus myosuroides</i> Annex to ISPM 27 (Diagnostic protocols for regulated pests)
<b>Submitted by</b> (Country or Organization)	IPPC Contracting Party
<b>IPPC Official Contact Point or RPPO</b>	New Zealand
<b>Supported by</b>	

### 2. Contact information

<b>Name</b>	Lihong Zhu
<b>Position and organization</b>	Portfolio Manager IPPC, Ministry for Primary Industries
<b>Mailing address</b>	PO Box 2526, Wellington 6140, New Zealand
<b>Phone</b>	+64 4 8940261
<b>Email</b>	ippc@mpi.govt.nz

### 3. Summary of proposal

<b>Summary of justification for the proposal</b>	<p><i>Alopecurus myosuroides</i> Huds., Black Grass, is an important agricultural weed in cereal crops in many countries. It is one of the worst agricultural weeds in Europe affecting numerous crops and is becoming a problem outside its native range. The species has a high level of variability morphologically and genetically meaning it can grow in a wide range of climatic environments. It also has extremely high seed production capacity facilitating its invasiveness. Blackgrass has a tendency towards developing herbicide resistance further exacerbating its weediness and making effective control of the species expensive. Black grass has been identified as a contaminant of seed lots providing a mechanism for effective long-distance dispersal. An accurate diagnostic protocol for this species would aid efforts to contain the species or eradicate it before it become established. The species is limited by climatic conditions and with increasing global temperatures the species may extend its range to colder latitudes. A diagnostic protocol would benefit many countries ensuring a consistent approach to diagnostics and combine all the essential diagnostic</p>
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	information such as taxonomic keys and molecular bar codes into one publication.
<b>Proposed priority</b>	2
<b>Comments</b>	Black grass is one of the worst agricultural weeds in Europe. Climate disruptions could exacerbate the spread of this weed and a diagnostic protocol would be a benefit to many countries.

#### 4. Literature review

<b>Literature review</b>	<p>A. myosuroides is an annual species and has become one of the worst weeds of cereal crops in Western Europe. Changing agricultural practices have allowed the weed to invade farmland more successfully. It is naturally herbicide resistance making control of the species more problematic. A. myosuroides has a high seed production capacity facilitating spread and establishment when introduced to new areas. It is a known contaminant of agriculture. A. myosuroides is one of the worst agricultural weeds in Europe with reductions in yield of up to 15.6% in a barley crop and recent models showing potential drops of income up to 500 € ha. Black grass is known to effect 23 crop species in 37 countries including areas outside its natural range such as North America. It also has potential impact on agricultural seed trade. Much research has been carried out looking at the herbicide resistance characteristics of Black grass. Less work has been done on developing a diagnostic protocol for the grass species itself. Aldrich-Markham S, 1992. Pacific Northwest Extension Publication 377. Corvallis, Oregon: Oregon State University.</p> <p>Christophe Délye ,Chrystel Deulvot,Bruno Chauvel 2013 DNA Analysis of Herbarium Specimens of the Grass Weed Alopecurus myosuroides Reveals Herbicide Resistance Pre-Dated Herbicides. <a href="https://doi.org/10.1371/journal.pone.0075117">https://doi.org/10.1371/journal.pone.0075117</a></p> <p>Délye C, Straub C, Matějček A, Michel S, 2004. Multiple origins for black-grass (Alopecurus myosuroides Huds) target-site-based resistance to herbicides inhibiting acetyl-CoA carboxylase. Pest Management Science, 60(1):35-41.</p> <p>Franco-Ortega Sara, Goldberg-Cavalleri Alina, Walker Andrew, Brazier-Hicks Melissa, Onkokesung Nawaporn, Edwards Robert Non-target Site Herbicide Resistance Is Conferred by Two Distinct Mechanisms in Black-Grass (Alopecurus myosuroides) 202</p> <p>Lan Y, Sun Y, Liu Z, Wei S, Huang H, Cao Y, Li W, Huang Z. Mechanism of Resistance to Pyroxusulam in Multiple-Resistant Alopecurus myosuroides from China. Plants. 2022; 11(13):1645. <a href="https://doi.org/10.3390/plants11131645">https://doi.org/10.3390/plants11131645</a></p> <p><a href="https://keys.lucidcentral.org/keys/v3/AusGrass/key/AusGrass/Media/Html/ALOPECUR/ALOMYO.HTML">https://keys.lucidcentral.org/keys/v3/AusGrass/key/AusGrass/Media/Html/ALOPECUR/ALOMYO.HTML</a></p>
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#### 5. Criteria for prioritization of Diagnostic Protocols

Criteria	Information provided by Submitter
<b>1. Need for international harmonization of the diagnostic techniques for the pest (e.g. due to difficulties in diagnosis or disputes on methodology)</b>	There is no current identification standard for Black Grass. Standardisation of diagnostic protocol will be of benefit as black grass spreads or becomes weedy in new locations. Fast accurate ID will help facilitate control and recognise distribution changes.
<b>2. The relevance of the diagnosis to the protection of plants including measures to</b>	This protocol would be for the identification of a pest plant, to limit its impact of agriculture. Early recognition could help eradication efforts and control. The ability to recognise black grass seeds that are contaminant of agricultural seed lots would

<b>limit the impact of the pest.</b>	also enhance biosecurity of areas where the weed is not yet present.
<b>3. Importance of the plants protected on the global level (e.g. relevant to many countries or of major importance to a few countries).</b>	Black grass has negative impacts on the growing of many commercial crops especially cereals but also fruits and vegetables including species from the following families Apiaceae, Brassicaceae, Chenopodiaceae, Fabaceae, Liliaceae, Poaceae, Rosaceae, Rutaceae, and Solanaceae
<b>4. Volume / importance of trade of the commodity that is subjected to the diagnostic procedures (e.g. relevant to many countries or of major importance to a few countries).</b>	A major economic weed especially of cereal crops in many countries especially in Europe and North America. The agricultural seed trade is a dispersal pathway so this can be impacted by the presence of contaminant seeds. This weedy nature is likely to become more of a problem worldwide as climate changes and agricultural practices change. It is an unwanted or prohibited plant in many countries. Better targeted control measures could reduce agrichemical use and reduce costs associated with food production.
<b>5. Other criteria for topics as determined by CPM that are relevant to determining priorities</b>	Black grass is predisposed to herbicide resistance making its control and eradication harder. Fast accurate ID will help controlling the distribution and spread of the weed.
<b>6. The balance between pests of importance in different climatic zones (temperate, tropics etc) and commodity classes.</b>	This is an agricultural weed of temperate areas. It is likely to become a weed problem in higher latitudes as climate change continues.
<b>7. Number of labs undertaking the diagnosis.</b>	Unknown, many labs worldwide could use this protocol.
<b>8. Feasibility of production of a protocol, including availability of knowledge and expertise.</b>	A diagnostic protocol is feasible. Morphological diagnostic characters are well known and there are genetic sequences available on databases such as Genbank on which to develop a DNA sequence based diagnostic protocol.