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How would high priority pests be reported in the Western Australian grains industry?

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ABSTRACT

General surveillance activities have an important role in plant biosecurity for the early detection of pests (includes diseases) and for demonstrating area freedom. Currently general surveillance information for the grains industry in Western Australia is mainly collected though reports of suspect high priority pests to the state Department of Agriculture and Food (DAFWA). Little information is available on the likelihood that members of the grains industry would report a suspect high priority pest, where and who they report pests to, and the factors that influence their decisions to report pests. This study details a survey of members of the grains industry conducted to determine the reporting practices relating to plant pest and diseases in the grains industry. Results of the study indicate that growers preferentially report to agricultural consultants and the local DAFWA staff; whereas agricultural consultants and researchers are more likely to report to the DAFWA head office. Factors that influenced participants' reporting of suspect high priority pests included the ability to eradicate the pest or disease, free examination of suspect samples and the desire for more information about high priority pests. The ranking of factors varied with the role the individual had in the grains industry.

1. Introduction

Surveillance is defined by the International Plant Protection Convention (IPPC) as 'an official process which collects and records data on pest occurrence or absence by survey, monitoring or other procedures' (FAO, 2013, International Standards for Phytosanitary Measures (ISPM) No. 5). In terms of general plant health, surveillance could be loosely defined as any activity involving the close observation of plants or their surrounds, which generates information on the presence or absence of a pest. Thus, it also includes the collection of data on pest occurrence or absence through other sources such as published literature, data from diagnostic laboratories and reports from experts, growers, and agricultural consultants that have knowledge of the pest in the geographical area of interest. The terms 'specific survey' and 'general surveillance' are commonly used in the area of plant health, based on whether information is collected through active, targeted pest or host surveys (specific surveys) or through other activities that are not specifically undertaken for the pest(s) of interest such as results of routine diagnostic samples and reports to government departments (general surveillance) (FAO, 2013, International Standards for Phytosanitary Measures (ISPM) No. 5; Hellström, 2008; Kean et al., 2008).

General surveillance activities are an important part of early detection and demonstrating area freedom. General surveillance uses data that have been generated for other purposes and often includes reports of suspect cases to the authorities (Hadorn and Stärk, 2008; McMaugh, 2005). This information can be collected from many sources such as National and Regional Plant Protection Organisations, government agencies, universities and research institutions, scientific societies, diagnostic laboratories, producers, consultants, museums, published literature, unpublished data and reports from the public (FAO, 2011, International Standards for Phytosanitary Measures (ISPM) No. 6; McMaugh, 2005).

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Much of the data available from general surveillance in the Western Australia (WA) grains industry is collected through samples sent to diagnostic services and reports made to the Department of Agriculture and Food, Western Australia (DAFWA) by growers, agricultural consultants and researchers. Reporting systems and diagnostic laboratories routinely produce absence data that are not quantified in any way. These systems have the potential to provide a lot of information that could form part of a surveillance system and aid in demonstrating freedom from specific pests.

The performance of the general surveillance system components (SSCs) for reporting High Priority Pests (HPPs) are likely to be influenced by the pest/disease awareness of members of the industry and their decisions to report. Through the identification of influencing factors opportunities for improvement of the general SSCs can be identified (Hadorn and Stärk, 2008; Hopp et al., 2007; Palmer et al., 2009a, 2009b).

In the broader literature there are few studies of the likelihood that exotic pests and diseases are reported or the attitudes of farmers and other industry participants towards biosecurity. A recent study of sheep and cattle farmers in WA identified trust as a key contributor to perceived risks and farmers' willingness to actively participate in biosecurity and report suspect diseases to government departments (Palmer et al., 2009a). Further, a Norwegian study of sheep farmers identified a number of factors including compensation for loss, easy access to a district veterinary officer and free examination of suspect animals as important factors in farmers' decisions to report suspect scrapie infections (Hopp et al., 2007). There have been no studies to date in this area for plant biosecurity issues. Furthermore, the reporting structure in the WA grains industry has not been formally documented.

With a view to modelling the contribution of general surveillance to establishing HPP area freedom, we investigate the likelihood that unusual or suspect HPPs will be reported by WA grains industry participants to the relevant authorities. Reporting systems considered in this survey as potential systems for reporting HPPs in Western Australia included: 1) PestFax, a newsletter emailed weekly during the growing season; 2) AGWEST Plant Laboratories, the state plant pest and disease diagnostic laboratory; 3) AgLine, a state based phone hotline for agricultural issues; 4) PaDIS, the Pest and Disease Information Service (which deals mostly with home garden issues); 5) GrainGuard, a free diagnostic service for suspect HPPs provided by AGWEST Plant Laboratories and 6) National Hotline, a national phone hotline for reporting suspect HPPs.

Questionnaires are commonly used to elicit expert opinion and to gather information about a large population due to the ease of implementation and reduced labour cost compared to interviews (Czaja and Blair, 2005; Dillman, 2000). A questionnaire was administered to members of the WA grains industry to 1) elicit the reporting structure for grains pests and diseases in Western Australia, 2) identify factors that influence reporting behaviour in the grains industry, and 3) elicit data that can be used in the quantitative evaluation of general surveillance programs for the grains industry in Western Australia.

2. Methods

The general SSC evaluated included reports of pests and diseases from the members of the grains industry in WA. This includes members of the general public who handle cereal grain as part of their main source of income, through involvement in growing grain crops, providing advice to growers of grain crops, handling of grain or conducting research or testing of grain crops. A cross-sectional survey was performed during the 2008 growing season (May–December) using both random and opportunistic sampling.

2.1. Questionnaire

The questionnaire was sent by mail to 300 randomly selected growers generated from DAFWA's Client Resources and Information Database. Complete sampling frames for the other groups involved in the grains industry do not exist and therefore opportunistic sampling was used to collect responses from these groups. Agricultural consultant groups, grower groups and researchers in Western Australia dealing with grain crops were identified from listings on the Australian Association of Agricultural Consultants (WA) Inc website (http://www.aaacwa.com.au/) and through a Google search. Larger agricultural consultant groups (12) and grower groups (2) were contacted through their state representatives with a request to circulate the questionnaire to their members. The leaders of grains based research groups at DAFWA (Biosecurity, Cereal breeding, Entomology and Plant pathology groups), CSIRO Entomology and Plant Industries, University of Western Australia, and Curtin and Murdoch Universities were also requested to circulate the questionnaire to staff in their groups. Thirty-seven agricultural consultants that operate as small businesses or individuals were contacted through individual emails. Agricultural consultants, grower groups and researchers were asked to complete the questionnaire online. For both the online survey and the mail out survey a reminder was sent approximately five weeks (35 days) after the initial contact.

When formulating the questionnaire care was taken to ensure that a clear outline of the purpose of the survey was presented and that the questions were clear and unambiguous to reduce unintentional biasing of responses. Questions were posed in a variety of forms including Likert-scales, multiple-choice questions and a probability scale (Appendix 1). The order of the factors in questions 3, 7 and 8 were randomised in the online questionnaire. Four different randomisations were used for the mail-out questionnaire to reduce any bias that may have been introduced by the ordering of choices.

Questions 5 and 9 through 12 related to the likelihood that respondents would detect each of the four HPPs and the past problems detected and these are discussed in the accompanying paper (Hammond et al., 2015).

Question 6 detailed possible actions taken when a pest or disease issue was detected and responses were categorised as either reported or not reported. Actions equivalent to reporting the issue included discussing it with a consultant, contacting the local or head DAFWA office, phoning a hotline (AgLine, Pest and Disease Information Service (PaDIS) or the National Exotic Plant Pest Hotline), or sending samples to AGWEST Plant Laboratories. Other possible actions, including sending samples to another laboratory, disposing of destroying of the grain, doing nothing, applying a treatment or doing something unspecified were categorised as not reported.

Question 13 was used to determine the likely action the respondent would take if they detected one of four HPPs; *Tilletia indica* Mitra 1931 (Karnal bunt), *Puccinia striiformis* f.sp. *hordei* Eriksson 1894 (Barley stripe rust), *Diuraphis noxia* Kurdjumov, 1913 (Russian wheat aphid) and *Trogoderma granarium* Everts, 1899 (Khapra beetle). The options and coding for this question were the same as for Question 6.

2.2. Data management and analysis

The online questionnaire was designed and administered using SurveyMonkey, a web-based survey software available at www.SurveyMonkey.com (Finley, 2008). Statistical analysis of the survey responses was conducted in the statistical software environment R (version 2.11.0) using the reshape, plyr and stats packages