

Are you sure? A test of how herbicide resistance testing can inform weed management decisions

Rick Llewellyn^{1,2}, Fiona Dempster², Masood Azeem¹, Roberto Busi²
¹CSIRO, Urrbrae, Australia,
²University of Western Australia, Perth, Australia
(rick.llewellyn@csiro.au)

Summary Herbicide resistance testing services that confirm the resistance status of weed populations using submitted seed samples have been available in Australia for over 25 years. Despite growers in all cropping regions facing increasingly diverse forms of resistance across a widening range of weeds there is ongoing concern that testing services are underutilized. In this study we examine the use and information value of resistance testing from the grower and agronomist perspective with the aim of identifying opportunities for increased use and value. The study included 51 farms and 15 agronomists involved with the collection of 230 weed samples (annual ryegrass, wild radish, brome grass, barley grass and capeweed) in 2020 from 128 Western Australian cropping paddocks. These were tested at University of Western Australia and classified as Resistant, Developing or Susceptible to a total of 50 herbicide treatments. To evaluate how paddock-specific herbicide resistance testing information can inform existing knowledge of

resistance status, the perceived resistance status of tested populations was elicited from twenty-five growers and 15 agronomists prior to testing. Sixty percent of the growers had undertaken some herbicide resistance testing in the past 10 years, although usually not regularly, and most relied on visual observation to determine resistance status. Resistant populations (based on test results) were very rarely perceived to be susceptible (and vice versa). There was a greater tendency for growers to overestimate the developing resistance status of susceptible populations. Perceptions and test results were less well aligned for forms of resistance that can be more difficult to observe in the field e.g. pre-emergence herbicides and broadleaf herbicides commonly used in mixes. Opportunities are identified where test results can offer the most potential value and barriers to testing can be reduced.

Keywords Herbicide, resistance, testing, adoption, economics, behaviour