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A global effort in germplasm characterization and breeding for resistance to Russian wheat aphid in wheat and barley

Cakir Mehmet[1]

[1]Murdoch University 90 South Street 6149 Murdoch Australia

(Additional authors from 15 other institutions:
Janine Vitou[2], Daniel Kollehn[1], Wendy Lawson[3], Hulya Ilbi[1], Scott Haley[4], Frank Peairs[5], Dolores Mornhinweg[6], Mustafa Bohssini[7], Francis Ogbonnaya[7], Jocob Lage[8], Vicky Tolmay[9], Joyce Malinga[10], Owain Edwards[11], Mandy Christopher[12], Ana Maria Castro[13], Jerome Franckowiak[3], Haydn Kuchel[14], Bertus Jacobs[15], Iain Barclay[16], John Sheppard[12])

The Russian wheat aphid, Diuraphis noxia, is one of the most damaging insect pests in most wheat and barley growing areas around the world. This aphid is not yet present in Australia but its potential introduction would cause significant financial losses to the Australian grains industry. Because of this threat, a project has been initiated to allow extensive collaborations among RWA workers from a number of countries to facilitate germplasm exchange and provide excess to the RWA biotypes existing in different regions of the world.
The objectives of the study are to: 1) characterize available RWA resistant wheat and barley germplasm against available RWA biotypes around the world, 2) identify molecular markers closely linked to resistance genes, and 3) introgress RWA resistance into Australian wheat and barley backgrounds.
To date, 20 barley resistance sources and over 70 wheat lines were evaluated in standard seedling screening tests against a number of RWA biotypes collected from Mexico, Hungary, South Africa and France in Montpellier, France, and endemic biotypes in USA, Kenya, South Africa, Syria and Argentina. Lines with moderate to good levels of resistance were identified. Results from the testing of Australian barley lines against US biotype 1 in Oklahoma-USA, and wheat lines against a number of biotypes have shown that all were susceptible. Allelism tests, and diversity analysis of RWA resistant wheat and barley lines with the molecular markers will also be discussed. Validation of published markers and identification of new markers for new sources of resistances are progressing well. Introgression of resistance genes to Australian wheat and barley lines will also be reported.