



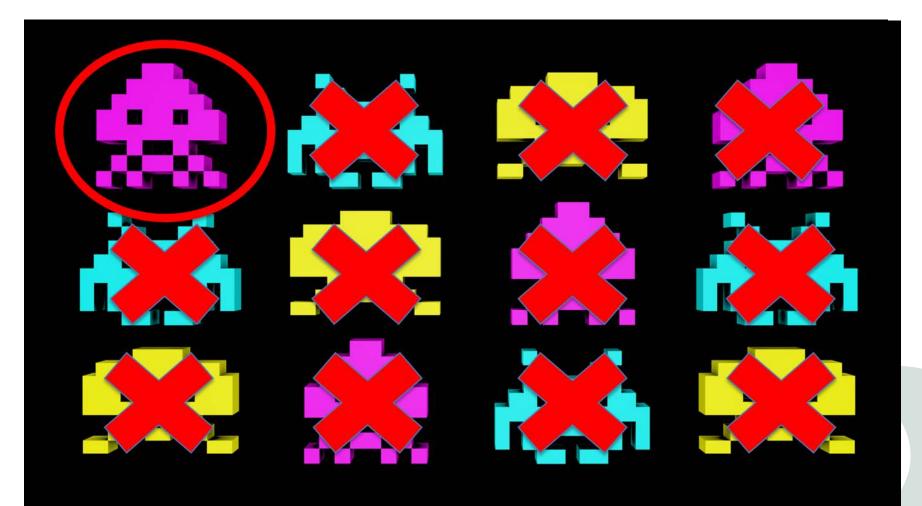
Using pest assemblages to rank species with potential to invade: the self organizing map analysis, validation and recommendations

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24 August 2015

Species listing process

Which species?



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Regional pest assemblages

Pest profile

region	Species1	Species 2	Species 3	Species4	•••	Species873
New Zealand	1	0	0	1		1

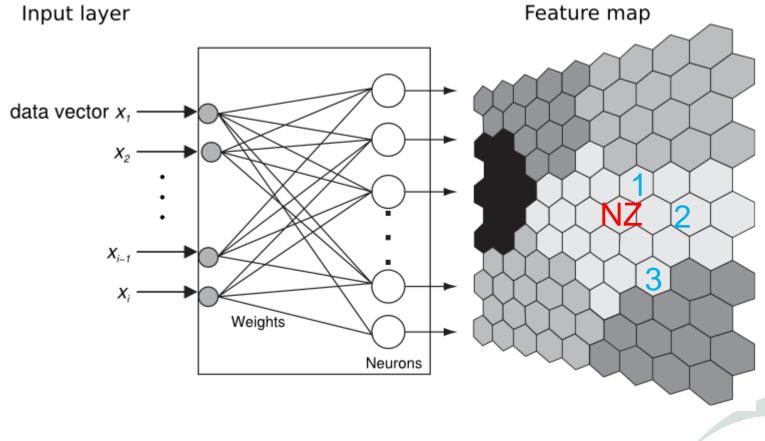
Matrix with 452 regions and 873

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Regions

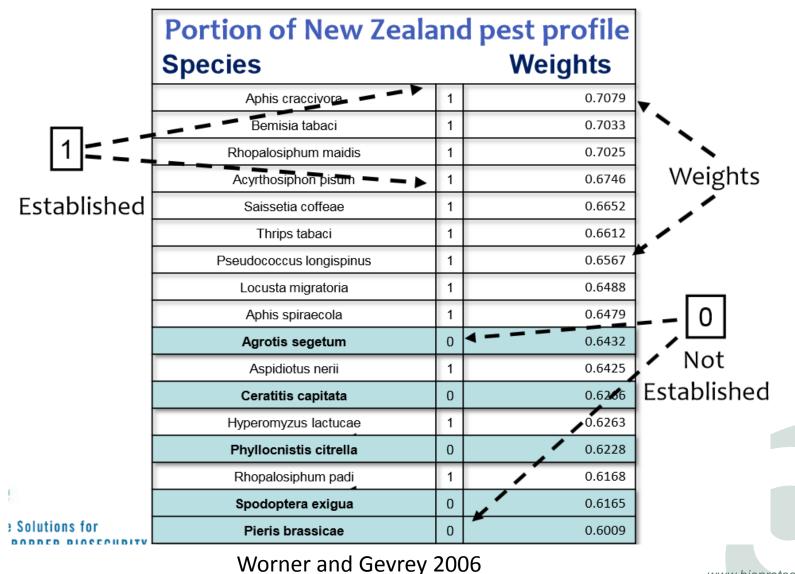
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The method – The self organizing map



1,2,3 – countries classified close to NZ by the SOM

Background 3 – The outputs



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5

Who else is using it?

First application	2006 – Worner and Gevrey				
Sensitivity analysis (Australian data)	2010 – Paini et al				
SOM validation(New Zealand data)	2010/2011 – Watts and Worner, Worner and Souquet				
SOM application (Finnish data)	2011 – Vanninen et al.				
SOM validation (USA data)	2011 – Suiter,				
SOM validation (simulated data)	2011 – Paini et al				
SOM integration into a PRA framework	2013 – Singh et al				
SOM application (weeds)	2014- Morin et al.				
SOM validation	2014 – Roige and Worner [in preparation]				

6

Objective 1: Sensitivity analysis of the SOM approach

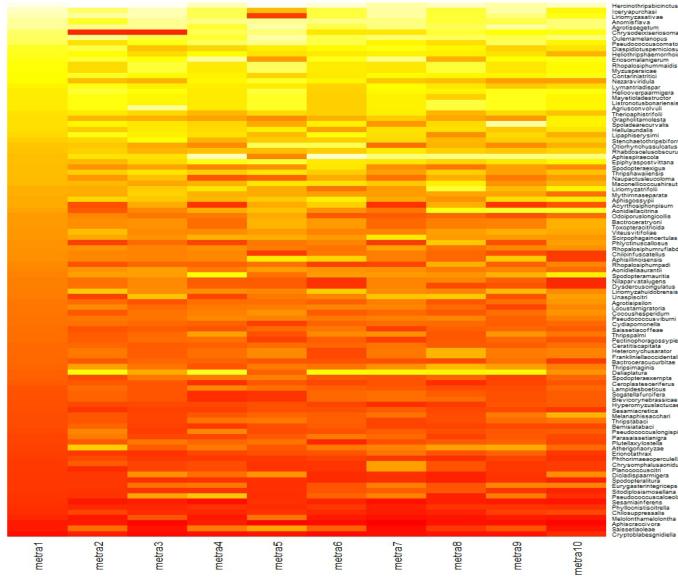
Objective 2: Investigate whether other algorithms can perform SOMs the best clustering method for absence/presence data to indicate risk of invasion?

Objective 3: Adding more information to the regional profiles. Adding climate and host data?

Testing the weights and the ranks - METRADISC



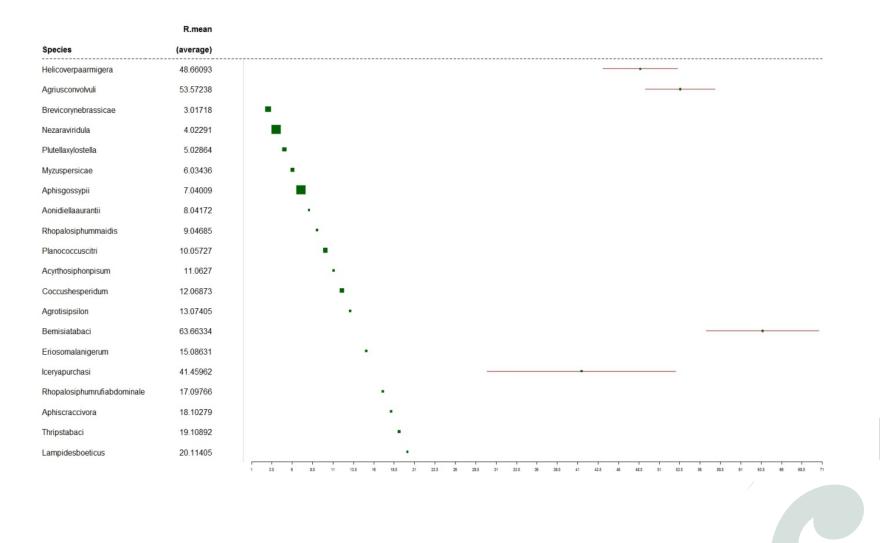
Testing the weights and the ranks - METRADISC



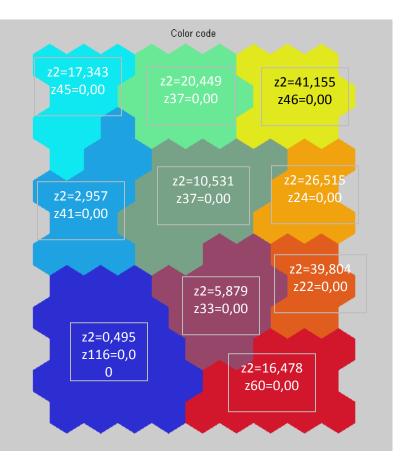
Agrotissegetum Chrysodeixiseriosoma Oulemamelanopus Pseudococcuscomstocki Diaspidiotusperniciosus Heliothripshaemorrhoidalis Eriosomalanigerum Rhopalosiphummaidis Myzuspersicae Contariniatritici Nezara viridula Nezaravindula Lymantriadispar Helicoverpaarmigera Mayvetioladestructor Listronotusbonariensis Agriusconvolvuli Therioapholitamolesta Spoladearecurvalis Heliulaundalis Lipaphisenveimi Lipaphiserysimi Stenchaetothripsbiformis Otiorhynchussulcatus Rhabdoscelusobscurus Aphisspiraecola Epiphyaspostvittana Spodopteraexigua Thripshawaiiensis Naupactusleucoloma Maconellicoccushirsutus Liriomyzatrifolii Mythimnaseparata Aphisgossypii Acyrthosiphonpisum Aonidiellacitrina Odoiporuslongicollis Bactroceratryoni Toxopteracitricida Viteus vitifoliae Scirpophagaincertulas Phlyctinuscallosus Rhopalosiphumrufiabdominale Chiloinfuscatellus Aphisillinoisensis Rhopalosiphumpadi Aonidiellaaurantii Spodopteramauritia Nilspärvatalugens Dysderousoingulatus Linomyzahuidobrensis Unaspiscitu Agrotisipailon Looustaniiyataria Agrotisipailon Covustaniiyataria Peetudoooccus viburni Cydiapomonella Saissetiaooffeae Thripspalm Peetuophoragos sypiella Ceratitisoganitata Heitelohyohusoidentallis Bactrooeracouuchtitae Thripsimaginis Deliaplatura Nilaparvatalugens Deliaplatura Spodopteraexempta Ceroplastesceriferus Lampidesboeticus Lampidesboeticus Sogatella furcifera Brevicorynebrassicae Hyperomyzuslactucae Sesamiacretica Melanaphissacchari Thripstabaoi Bemissiatabaci Pseudocoocuslongispinus Paraasisestianiora Parasaissetianigra Plutellaxylostella Atherigonaoryzae Erionotathrax Phthorimaeaoperculella Chrysomphalusaonidum Planococcuscitri Dicladispaarmigera Spodopteralitura Spodopterailtura Eurygasterintegriceps Sitodiplosismosellana Pseudococcuscaloeolariae Sesamiainferens Phyllocnistiscitrella Chilosuppressalis Moloonthamoloontha Melolonthamelolontha Aphisoraccivora Saissetiaoleae Cryptoblabesgnidiella

9

Testing the weights and the ranks - METRADISC

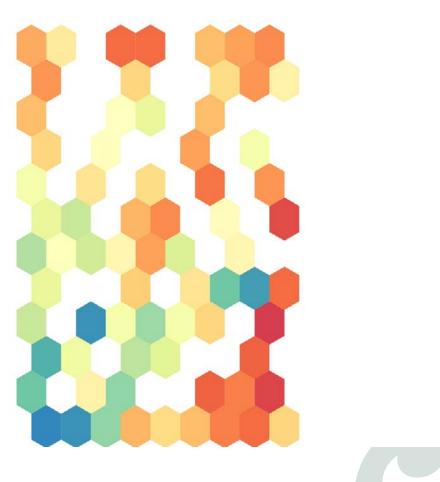


Clustering validation Z-metric



Values of Z2 and Zhighest by cluster

Values of Z/Z1 per cell



0.7

0.6

- 0.5

- 0.4

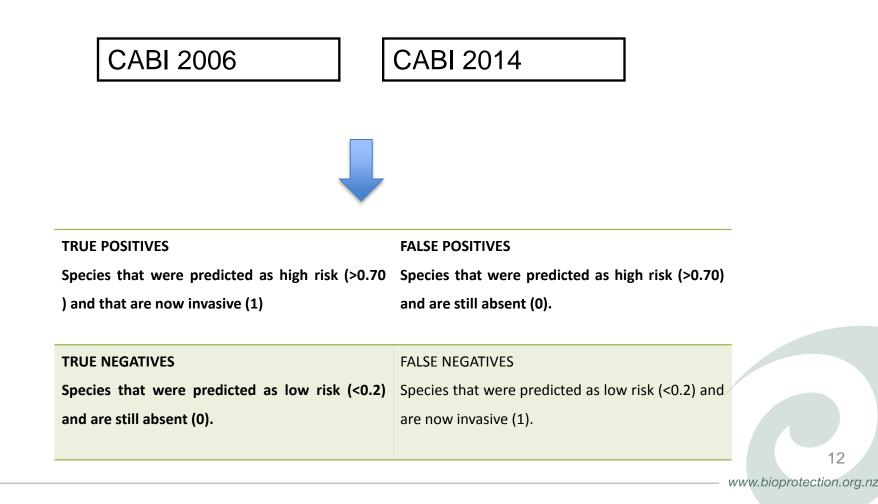
0.3

0.2

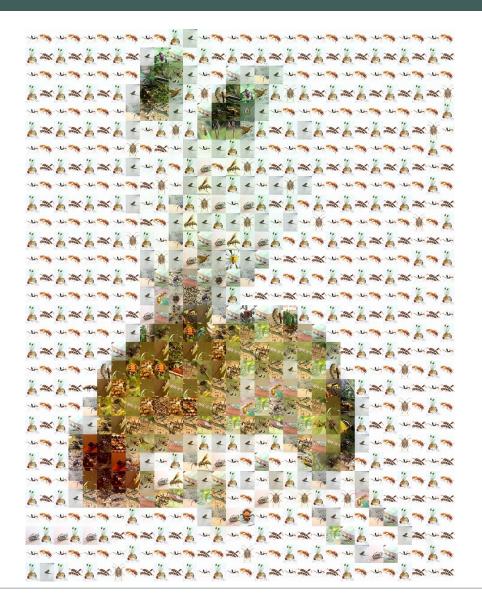
0.1

Objective 2 - A posteriori multi technique analyses

SOMs K-Means Hierarchical Classification Fuzzy Classification



Future research



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Thank you



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Dr. Craig Phillips, AgResearch New Zealand



Dr. Matthew Parry, Statistics Dpt. University of Otago New Zealand



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