| DATA SCIENCE | LINLEY JESSON |
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| Outcome More sustainable and profitable systems. Impact Indicators  * Maintained and/or increased crop volumes, value and profitability * New Zealand’s productive environments sustained or enhanced, generating products with verifiable reduced footprints to maintain and/or increase market access.  Science Targets  * Whole systems modeling and prediction platform * Tools developed for eco-verification, footprinting and traceability (water, carbon, greenhouse gases, soil, biodiversity, pesticides, social equity) * Improved production technologies and cultivars based on scaled up knowledge from molecular, physiological, soil, water and environmental science, integrated with system science.  Impact HighlightKate Richards in conjunction with Rolf Turner from Auckland University have been working on a paper to provide a statistical framework for data analysis methods that are used in problems that arise in quarantine research and address the problem of estimating lethal dose values in the context of fumigating export logs against several species of pine beetle. The approach is to make use of generalized linear mixed models on the basis of which we obtain interval estimates of a required lethal dose. They apply a “worst case scenario” paradigm in making a final choice of model. They first fit a wide range of models (determined by various choices of model characteristics). Then, after eliminating implausible values, find the maximum of the upper endpoints of the confidence intervals that were found. Then they take this maximum to be the (conservative) estimate of the required lethal dose.This framework was applied to a series of datasets exploring the dose of methyl bromide required to reach probit 9 level mortality. The current regulation for export of logs to china require a 16hr fumigation at a dose of 80-120g/m3 depending on temperature. Methyl bromide is a ozone depleting fumigant where the gas has to be recaptured. Using the framework described in the paper they were able to predict a lethal dose estimate 50% less than that currently required. This new dose of 40g/m3 is currently be tested in large scale at port trials.   Plot of the “fit” of the chosen model. The blue dots are the observed (“raw”) success  fractions. The red plus signs are the fitted success fractions with the (random) influence  of the replicates included. The black line is the fitted success fraction formed using fixed effects only. OutputsPeer-Reviewed Publications  * Butts C, van Klink J, Joyce N, Paturi G, Hedderley D, Martell S, Harvey D. 2018. Composition and Safety Evaluation of Tea from New Zealand Kawakawa (Piper excelsum). Journal of Ethnopharmacology First published version available online: 18-DEC-2018 DOI information: 10.1016/j.jep.2018.12.029 * Carpenter MA, Goulden DS, Woods CJ, Thomson SJ, Kenel FO, Frew TJ, Cooper RD, Timmerman-Vaughan GM 2018. Genomic Selection for Ascochyta Blight Resistance in Pea. Frontiers in Plant Science 9(1878). * Jaeger SR, Xia YX, Le Blond M, Beresford MK, Hedderley DI, Cardello AV. 2018. Supplementing hedonic and sensory consumer research on beer with cognitive and emotional measures, and additional insights via consumer segmentation. Food quality and preference, volume 73, <https://doi.org/10.1016/j.foodqual.2018.11.015> * Kim CK, Healey GR, Kelly WJ, Patchett ML, Jordens Z, Tannock GW, Sims I, Bell T, Hedderley D, Henrissat B, Rosendale DI. 2018. Genomic insights from Monoglobus pectinilyticus: a pectin-degrading specialist bacterium in the human colon. The ISME Journal, https://doi.org/10.1038/s41396-019-0363-6 * McIvor I, Douglas G, van den Dijssel C, Hedderley D, Brock S. 2018. Pollarding wide-spaced poplar trees on pastoral hillslopes alters root development. Agroforestry Systems, published online 18 December 2018, https://doi.org/10.1007/s10457-018-0341-4 * Parkar SG, Davis P, Trower TM, Hedderley DI, Sutton KH, Ingram JH. 2018. Factors affecting microbial metabolism in a human fecal fermentation model to evaluate prebiotics. Journal of Nutrition & Intermediary Metabolism, volume 15, published online December 2018, https://doi.org/10.1016/j.jnim.2018.12.003 * Sandeep Kumar, Bryan P Treloar, Koon Hoong The, Gemma Henderson, Graeme T Attwood, Sinead M Waters, Mark L Patchett, Catherine McKenzie, Peter H. Janssen. “Sharpea and Kandleria are lactic acid producing rumen bacteria that do not change their fermentation products when co-cultured with a methanogen”. Anaerobe, 25 July 2018. * J.E. J.E. Dalziel, G.A. Smolenski, Catherine McKenzie, S.R. Haines, L. Day. “Differential effects of sheep and cow skim milk before and after fermentation on gastrointestinal transit of solids in a rat model”. Journal of Functional Foods, August 2018. * Kiliana Bekelaar, Tania Waghorn, Michael Tavendale, Catherine McKenzie, Dave Leathwick. “Carbon dioxide is an absolute requirement for exsheathment of some, but not all, abomasal nematode species”. Parasitology Research, September 2018. * E.A. Sandoval-Cruz, C. R. McGill, R. C. Southward, C.M. McKenzie, S. D. Card, X. Z. He, M. Wang,M. P. Rolston and R. J. Chynoweth. "Does chemical control of blind seed disease (Gloeotinia temulenta) affect endophyte transmission in ryegrass seed crops?" Australasian Plant Pathology, October 2018 * Ashton, D. T., Hilario, E., Jaksons, P., Ritchie, P. A., & Wellenreuther, M. (2019). Genetic diversity and heritability of economically important traits in captive Australasian snapper (Chrysophrys auratus). *Aquaculture*. * Cook, D. G., Jaksons, P., & Jerrett, A. R. (2018). Tagging investigations with small estuarine-associated fish: tag evaluation, capture methodologies and assessment of capture stress and survival in yellow-eyed mullet Aldrichetta forsteri. *Marine and Freshwater Research*, *69*(10), 1595-1603.  Client Reports  * Baylis E, White A, Wallace S, Ha B, O'Donnell K, McAtee P, Gannabathula S, Richards K, Rebstock R, Hallett I, Harker R. 2018. FP1936 Gold3 bin storage and handling damage. A Plant & Food Research Client Report prepared for Zespri Group Ltd. SPTS No. 17242. * Bennett JS, Grose C, Albright A, Horner R, Stewart L, Topal T, McLachlan A. 2018. Influence of the timing of canopy trimming and harvest on Sauvignon blanc berry maturation, settled juice and wine composition. A report prepared for New Zealand Winegrowers Inc.. Plant & Food Research Client Report: SPTS 17233. * Campbell, R., Butler, R., Turner, L., Patrick, E., Scheper, R. & Walter, M. 2018. Neonectria ditissima infection risk. Plant & Food Research Client Report. A report prepardd for New Zealand Apples & Pears Inc. SPTS No. 17213. 22 p * Gillespie RN, Gosden ML, Richards KK, White RA. 2019. Soil nutrient management in dairy farming: a systems comparison – year 6 report. A Plant & Food Research Client Report prepared for Backtrack Dairies. SPTS No. 17415. * Grose C, Stuart L, Rutan T, Yang L, Albright A, McLachlan A. 2018. New Zealand Winegrowers Research Centre Pinot Noir Programme, RA4.2 – Validation wines annual report December 2018. A report prepared for New Zealand Winegrowers Inc.. Plant & Food Research Client Report: SPTS 17330. * Ha B, Baylis E, Wallace S, Rebstock R, Hallett I, Richards K, Bullot W, Harker R, White A. 2019. FP1945: Gold3 superficial skin damage. A Plant & Food Research Client Report prepared for Zespri Group Ltd. SPTS No. 17401. * Ha B, Hunter D, Pidakala P, White A, Hedderley D, Lee PY, Roigard C, Le Blond M, Wallace S, O’Donnell K, Billing D, Harker R. 2018. FP1888 Shifting Zespri SunGold Kiwifruit volume to earlier in the season - Ethylene conditioning. A Plant & Food Research Client Report prepared for Zespri Group Ltd. SPTS No. 17266. * Michel A, Sinton S, Dellow S, Shah F, Dohmen-Vereijssen J, Furlong J, Richards K, Fletcher J, Falloon R, Judson D. 2019. Potato yield gap 2016-18: seed tuber health. A Plant & Food Research Report. SPTS No. 16852. * van Toor, R., Hoyte, S., Ah Chee, A., Phipps, J., Rees, J. & Butler, R. 2018. Preventing ascospore production for control of Sclerotinia. Plant & Food Research Internal Report SPTS No. 17175. 30 p * Volz RK, Bowatte D, Breen K, Brewer L, Bus V, Campbell R, Carroll E, Dayatilake DG, Deng C, Diack R, Hedderley DI, Horner M, Jaksons P, Jesson L, Johnston J, Kirk C, Kitson B, Lloyd H, Marshall C, Oliver MJ, Patrick E, Proffit N, Punter M, Seymour S, Singla G, Tattersall A, Turner L, Walter M, Weskett R. 2018. The Plant & Food Research Apple and Pear Breeding Programme – Annual Report 2017-18. A Plant & Food Research Client Report prepared for Prevar Ltd. SPTS No. 17336. * Walter, M., Campbell, R., Turner, L., Patrick, E., Vorster, L. & Butler, R. 2018. Field trial (2018/19) to test Henry Manufacturing Ltd products on the control of European canker (Neonectria ditissima) infection of apple picking wounds. Plant & Food Research Client Report . A report prepared for Henery Manufacturing Ltd. SPTS No. 17380. 18p * White A, Hunter D, Baylis E, Billing D, Ha B, Pidakala P, Wallace S, O'Donnell K, Cho J, Wohlers M, Beresford M, Lee PY, Le Blond M, Roigard C, Richards K. 2018. NP1903 Red19 Kiwistart fruit: ripening and consumer responses. A Plant & Food Research Client Report prepared for Zespri Group Ltd. SPTS No. 17297. * Tuckey NPL, Lee PY, Timms B, Guo L, Beresford MK, Phelps T, Xia YX, Le Blond M, Chheang SL, Jin D, Roigard C, Jaeger SR. December 2018. Product characterisation and Chinese consumer responses to individually quick frozen Greenshell mussels harvested from Coromandel, Marlborough and Stewart Island in January and February 2018. A Plant & Food Research report prepared for: Cawthron Institute. Client ref: CAWX1315. Milestone No. 79814. Contract No. 30983. Job code: P/533002/01. SPTS No. 17258. * Page-Weir N, Bellve A, Barraclough E, Hawthorne A, Redpath S, Poulton J, Baldassarre C, Chhagan A, Guo L. December 2018. Screening the efficacy of various products against mites in an *in vitro* trial. A Plant and Food Research report prepared for: Avocado Industry Council Limited. Milestone No. 79914. Contract No. 36263. Job code: P/340302/01. SPTS No. 17304. * Currie M, Olsson S, Ansorge J, Blattmann M, Gould N, Haisman N, Guo L, Warren S. December 2018. NP1751 Pre harvest Fruit drop in 'Zes007' (Green11) 2017. A Plant & Food Research report prepared for: Zespri Group Limited. Milestone No. 70760. Contract No. 34200. Job code: P/415571/01. SPTS No. 17325.  Invitations to Participate on Editorial BoardsPresentations Given at International or National Conferences or Meetings Ruth Butler was invited to organise a session “Consulting in the real world: Communicating statistics to scientists” at the Australasian Applied Statistics Conference. Both she and Linley Jesson presented within this session, along with Gabriella Borgognone (Quensland DAFF) and Helene Thygesson (DOC). The talks were followed by a vigourous discussion.   * Butler, R. 2018. "From Cradle to grave": making and impact from conception to publishing. Australasian Applied Statistics Conference, Rotorua, 2-7 December 2018. Pp. 45. * Hedderley D, McGhie T, Cordiner S, Lila M, Cheatham C. 2018. A comparison of partial least squares and random forests for metabolomics analysis. New Zealand Statistic Association conference, 27-30 November, Palmerston North * Alec Mackay, Ronaldo Vibart, Catherine McKenzie. “Changes in soil carbon in hill country under contrasting phosphorus fertiliser and sheep stocking rate”. NZ Grasslands Association, Twizel, 6-8 November 2018. * Linda Samuelsson, Nicola Schreurs, Catherine McKenzie and Kirsty Hammond. “Effect of fodder beet or ryegrass diets during pregnancy on lamb growth, carcass characteristics, meat quality and meat metabolites”. Australia New Zealand Metabolomics, 30 August- 1 September 2018, University of Auckland * Sullivan, N.J., Bell, V.A., Butler, R.C., Park, K.C., Lee, J.-A., Wallis, R., Reddy, D.S., Twidle, A.M., Bunn, B.J., Manning, L.-A.M., L., S. & Suckling, D.M. 2019. Analogues of the longtailed mealybug (Pseudococcus longispinus) pheromone and their behavioural responses. New Zealand Entomologist Conference., Hamner Springs, 7-9 Feb 2019 * Jesson, L.K. 2018. The view from the other side: A biologists view of communicating statistics. Australasian Applied Statistics Conference, Rotorua, 2-7 December 2018. Pp. 45. * Richard Volz, L. Brewer,M. Aldsworth,V.G.M. Bus,M. Horner,L.K. Jesson Breeding forfire blight resistance in an interspecific pear breeding programme. XII International Pear Symposium. Montevideo Uruguay December 4th-7th 2018. * Peter Jaksons, 2018. Ceci n'est pas une pipe… yet: Building data & analysis pipelines. AASC, Rotorua  Professional Development  * . | |
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