Tools and Resources for R Users in Agricultural Research

Julia Piaskowski, University of Idaho

Breeding & Genetics

Linkage & QTL Mapping

ASMap	mapping via the MSTmap algorithm
diaQTL	haploytpe analysis for dialleles
LinkageMapView	visualizing linkage maps
MapRtools	miscellaneous linkage mapping tools
onemap	MapMaker/EXP implementation in R
mappoly | polymapR	linkage mapping in polyploids
polyBreedR	DNA marker utiltiies for polyploids
polyqtlR | qtlpoly	QTL estimation in polyploids
qtl	full-featured package for linkage mapping and QTL analysis
statgenMPP	QTL mapping in multi-parent populations

GWAS

GWASpoly	GWAS for autotetraploids
megaLMM	GWAS for large number of observations
rMVP	GWAS for large number of SNPs
StageWise	2-stage GWAS analysis
statgenGWAS	single trait GWAS estimation

Genetic Prediction

AGHmatrix	genomic relationship matrices
BGLR	Bayesian shrinkage-based genomic selection
breedR	Bayesian & frequentist tools for ag and forestry
cpgen	parallelized GBLUP and GWAS
lmeGS	mixed model with relationship matrix
lme4qtl	mixed model with G or A matrices
pedigreemm	mixed model with pedigree
plantbreeding	plant breeding multi-tool package
st4gi	analytical functions for plant breeding trials
qgtools	REML & MINQUE implementations
statgenIBD	IBD estimation for different mating designs
rrBLUP	random regression/BLUPs
sommer	mixed models with heterogenous covariances

Core R Packages

Agricultural Data Sets

agridat	data sets across many ag disciplines
agriTutorial	crop data + example analysis
AgroBioData	additional files (not an R package)
cropcc	climate-change crop data sets
fabio	USDA county-level fertilizer data
ggfertilizer	phenotype simulations for gene actions
simplePHENOTYPES	soybean nested mapping population
SoyNAM	

Agricultural Databases

cdlTools	process cropland data layers
CropScapeR	USDA cropland data layer API
FAOSTAT | faobulk	FAOSTAT database API
FedData	geospatial data from SSURGO APIs
rnassqs	NASS 'Quick Stats' API
tidyUSDA	NASS 'Quick Stats' API + mapping
rnoaa	NOAA API
rusda	USDA mycology databases
usdampr	Livestock Mandatory Reporting API

General Analysis

agriCensData	models for censored data in agriculture
Environmetrics	CRAN task view for ecological studies
hnp	half normal plots with simulation envelopes from different models
Missing Data	CRAN task view for imputation
Meta-Analysis	CRAN task view
nlraa	non-linear models for agriculture
Psychometrics	CRAN task view for psychological measurements
survival	CRAN task view for censored data
SocialScience	CRAN task view

Other Packages

Agronomic Field Trials

agricolae	trial design and analysis
asreml | asremlPlus	comprehensive analysis suite
desplot	for mapping trials arranged in a grid
ExperimentalDesign	
statgenHTP	CRAN Task View
INLA	high throughput phenotyping
statgenSTA	Bayesian latent Gaussian models single trial analysis + spatial

GxE Interactions

bayesammi	Bayesian AMMI model
EnvRtype	climate data assemblage & envirotyping
FW	Finlay-Wilkinson regression
gge	GGE biplots
IBCF.MTME	genetic prediction across environments
statgenGxE	general GxE analytical tools

Soil Science

aqp	soil pedology functions
fertplan	soil fertility recommendations
sharpshootR	soil survey utility function
soilDB	USDA-NRCS database API
soilTaxonomy	parsing soil taxonomy
Spatial	CRAN Task View
Spatio-Temporal	CRAN Task View

Plant Pathology

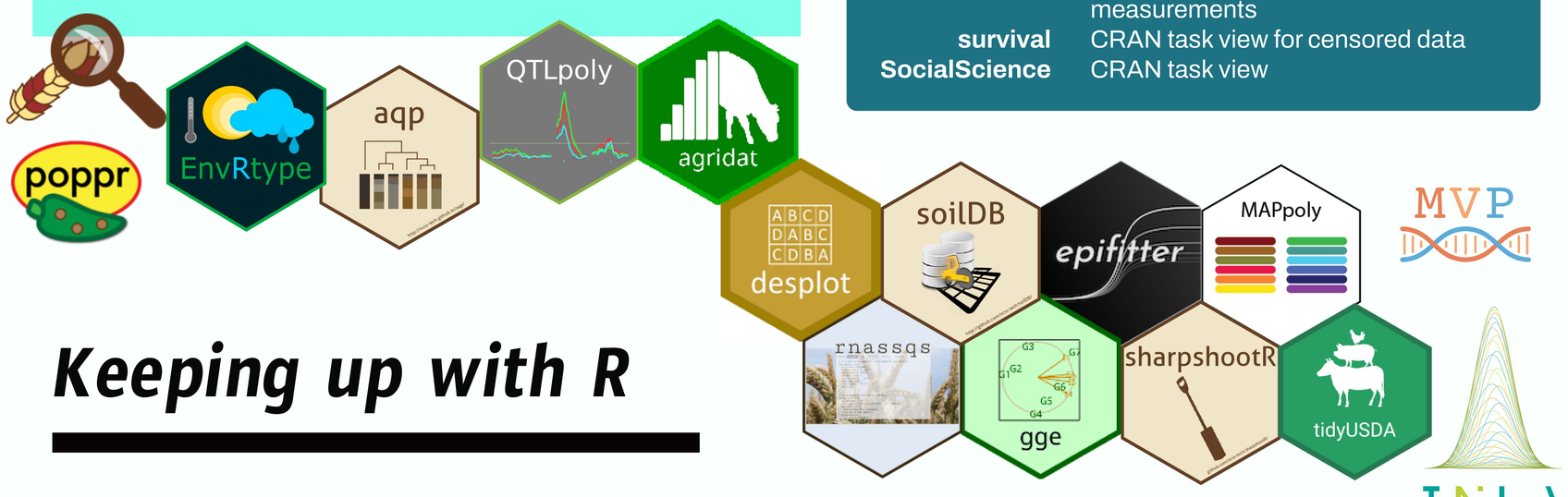
ascoTraceR	simulate Ascochyta blight infestations
epifitter	disease progress curves
epiphy	plant disease epidemiology
hagis	plant pathogen pathotype analysis
poppr	genetic analysis of asexually reproducing populations

Weed Science

drc	dose-response fitting curves
PROSPER	simulate weed population dynamics

Crop Modelling

apsimx | rapsimng	classic and next generation packages for handling APSIM files
DSSAT	interface to the DSSAT model
Meteor	climate data manipulation
phenoriceR	phenorice model implementation
Recocrop	ecocrop model implementation
Rquefts	quefts model implementation
Rwofost	WOFOST model implementation



Keeping up with R

R-weekly	Curated weekly summaries
CRAN Task Views	R package guides for major topics
Ag Stats Cran Task View	[proposed task] view for agricultural statistics
rOpenSci	community for open, reproducible science
R-Universe(s)	Organizational repostories for package discovery
Idaho AgStats R-Universe	R-Universe for agricultural statistics