An empiricist's guide to modern coexistence theory

Information about study system	**Do you know the factors that control population dynamics?**	no	no	no	yes	yes
	How will empirical data be obtained?	experimental	experimental	experimental or observational	experimental	experimental
	Can you have monocultures?	yes	yes	no	yes	yes
	Can you assume ≥ 1 species is at steady-state?	no	yes	yes*	no	no
	Method works for > 2 species?	no	?	yes	yes	no
	The resource is:	not explicit or biotic (dynamic)	not explicit	not explicit	biotic (dynamic)	abiotic
Method		**Lotka-Volterra**	**Sensitivity**	**Negative frequency dependence**	**MacArthur's CRM**	**Tilman's R* CRM**
	Foundational paper for model	Volterra 1928	MacArthur 1970	Rees and Westoby 1997	MacArthur 1970	Tilman 1977
	Theoretical paper linking model to MCT	Chesson 2000	Carrol et al 2011	Adler et al 2007	Chesson 1990	Letten 2017
	Empirical paper using model for MCT	Godoy and Levine 2014	Narwani et al 2013	Levine and HilleRisLambers 2009	none	Letten 2017
Inputs	**Species A monoculture**	yes	yes	no	yes	yes
	Species B monoculture	yes	yes	no	yes	yes
	Species A invading species B	no	yes	no	no	no
	Species B invading species A	no	yes	no	no	no
	Mixtures of species A and B	≥1	no	≥2	no	no
	Time-series required	long	short	short	none	none
	Number of experiments for pairwise predictions for n species	$(n + n^2) / 2$	n^2	$n^2 - n$	2n	2n
	Additional experiments for pairwise predictions for n^{th} species	n	2n - 1	2 (n - 1)	2	2
Outputs	**Information is specific to:**	species & pairs	species & pairs	species & pairs	species only	species only
	Inter- and intra-specific interaction coefficients (α_{ii}, α_{ij})	yes	yes	no	yes	yes
	Coefficients apply to	all population densities	invasion from rare	all population densities	invasion from rare	invasion from rare
	ND and RFD	yes	yes	no	yes	yes
	Predictability	none	none	none	some	some