

Table S1: Example literature from different experimental and modelling systems on how mechanisms of trophic flexibility affects ecosystem functions via trophic traits. Literature selection underlying Figs. 1 and S1 is indicated by number code used in Fig. S1.

Evidence for effects of flexible trophic interactions on ecosystem functions		Experimental / modelling system					Ecosystem functions			Reference	
							underrepresented in spatially explicit models	typically represented in spatially explicit models			
mechanism generating flexibility	trophic trait	batch cultures semi-continuous chemostats	meso-cosms indoor outdoor	time-series & field studies	models bi-trophic tri-trophic food chain food web other	Biomass production - secondary Trophic transfer efficiency predator-prey biomass (ratio)	Carbon cycling Primary (biomass) production	Nutrient cycling resource use efficiency	number code in Fig. S1 according to approach		
phenotypic plasticity	defence, organism size, food quality	x							i12	Brandenburg et al., 2021	
	defence, organism size, food quality	x				(-)	x		i4	Brandenburg et al., 2018	
	defence				x x	(x) x		(x)	o5	Vos et al. 2004a	
	defence				x x x	(+) x (+)		x	o4	Verschoor et al. 2004	
	defence			x		x x			t3	Pohnert et al. 2007	
	offence	x				(-)			i1	Kopp & Tollrian 2003a	
	defence, offence	x				(=)			i5	Kopp & Tollrian 2003b	
	foraging mode			x	x	x			o12	Harvey & Railsback 2014	
	nutrient uptake, food quality	x x							i10	Harrison et al., 1990	
	nutrient uptake, food quality	x							i11	Goiris et al., 2015	
	food quality, size, morphology		X						i2	Klip et al., submitted	
	nutrient & light uptake				x	x x x	x	x	o3	Kerimoglu et al., 2018	
	nutrient & light uptake				x	x x x	x	x	o3	Kwiatkowski et al., 2018	
	Extracellular release rate			x					t2	Lancelot, 1984	
	stoichiometry		x			(-) (-)			i9	Maat et al. 2014	
	stoichiometry	x x				(-)			i13	Bentley et al., 2021	
	stoichiometry, size		x			(-)			i16	McBeain & Halsey, 2018	
	food quality, life history traits	x x				x (x) (X)	x	(x)	i17	Boersma et al., 2009	
	food quality, life history traits	x				x x (x)	x	x	i18	Malzahn et al., 2007	
	food quality, life history traits	x				x x (x)	x	x	i19	Malzahn et al., 2010	
	stoichiometry				x	x			o15	Mitra 2006	
	stoichiometry				x	x			o16	Mitra et al. 2007	
	food quality, stoichiometry	x				x x			i3	Meunier et al., 2012a	
	selectivity	x							i14	Herstoff et al., 2021	
	nutrient & light uptake		x		x					Pahlow et al., 2013	
	phyto acclimation to nutrient and light				x					Jaeger et al 2008	
	defence				x x					Yamamichi et al., 2019	
	defence				x x x	(x) x		(x)		Vos et al. 2004b	
	selectivity				x x	x x		x		Castellani et al. 2013	
	selectivity				x x x x		x			Krivan & Schmitz 2003	
	nutrient & light uptake				x		x	x		Kerimoglu et al., 2017	
	defence				x x		x			Urbani et al. 2010	
	defence				x x		x			Serizawa et al. 2008	
	defence	x					x	x		Ianora et al. 2004	
	defence, offence	x				x				Banerji & Morin 2009	
	defence	x		x	x x					Fischer et al. 2014	
	polymorphism	x					x			Tesson et al., 2009	
inherited mechanism	defence, offence			x	x x	x (x)			o8	Fleischer et al. 2018	
	food quality	x			x	x x			o14	Sperfeld et al. 2012	
	defence, offence			x	x x x	(-) (+)		(-)		Raatz et al., 2019	
	selectivity				x		x	x		Prowe et al. 2012	
	defence				x x		x			Kondoh 2007	

adaptation by unspcif	defence				x x x	x	x	Nakazawa et al., 2010
	defence, offence				x x	x		Mougi & Iwasa 2011
	defence, offence				x x	x		Mougi & Iwasa 2010
	defence, offence			x	x x x x	x (x)	x	Van Velzen & Gaedke, 2017
	defence, offence			x	x x x x	x x	x	Van Velzen & Gaedke, 2018
	defence, selectivity			x	x x x x	x	x	Klauschies et al., 2016
	unspecified				x	(x) x		Abrams 2001
rapid evolution	toxicity tolerance		x			(x)	x	e1 Chislock et al. 2019
	stoichiometry	x			x	x x	x	o6 Dederck et al., 2015
	defence	x				x x	x	i6 John et al. 2015
	defence				x x x	(x) x		Ellner & Becks 2011
	unspecified						x	Kremer & Klausmeier 2017
	defence		x	x	x x	x		Becks et al. 2010
	defence		x	x	x x	x		Kasada et al. 2014
	defence		x	x	x x	x		Meyer et al. 2006
	defence, antibiotic resistance	x		x		x		Hiltunen et al. 2018
	defence, offence	x			x x			Duffy & Sivars-Becker 2007
	defence, offence	x						Agha et al. 2018
	defence, offence	x		x		x		Scheuerl et al. 2019
	selectivity			x	x x x	x x	x	Patel & Schreiber, 2015
	foraging activity				x			Mougi, 2020
species sorting	selectivity				x			o1 Smith et al. 2016
	selectivity		x		x x	(+/-)	() ()	e2 Stibor et al. 2004
	selectivity				x x	(x)	() x	o7 Wollrab & Diehl 2015
	selectivity	x				x x	x x	e3 Sommer et al. 2003
	selectivity		x	x	x x	(x) (x)	(x) (x)	t4 Wollrab et al. 2020
	selectivity		x		x	x x	x x	e4 Worm et al. 2002
	food quality				x x	(x) (x)	x x	o11 Perhar & Arhonditsis 2009
	food quality				x x	x		o13 Raatz et al 2017
	selectivity				x	(x) (x)	(x)	o10 Thongthaisong et al., submitted
	food quality	x				x		i7 Vad et al. 2020
	defence, offence				x x			Abdala-Roberts et al. 2019
	defence, offence			x	x x	(x)		Ehrlich & Gaedke 2020
	defence, offence		x			x x		Deraison et al. 2015
	selectivity			x		x		Ferretti et al. 2010
	selectivity	x				x x	x	Filip et al. 2012
	selectivity				x x x x	x x	x	Wollrab et al., 2012
	selectivity	x			x	x x	x	Filip et al. 2014
	food quality		x			x	x	Teurlincx et al., 2017
	food quality			x		x		Wilkinson et al. 2020
Combinations/interactions/comparisons	defence, selectivity	x			x x	x		o9 Van Velzen et al. 2018
	selectivity	x		x		x		t1 Boersma et al., 2016
	defence, offence, selectivity	x				X x		i8 Meunier et al., 2013
	unspedified				x x x	+ - + - (+ -)	+ -	Ceulemans et al. 2021
	stoichiometry, selectivity				x			Branco et al. 2018
	defence, selectivity		x	x		(x)		Vasseur & Gaedke 2007
	defence, selectivity				x x			Yamauchi & Yamamura 2005
	defence	x		x		x		Karakoc et al. 2020
	polymorphism		x			x	x	Matthews et al. 2016
	heat tolerance, life history traits	x	x			x		Vanvelk et al. 2021
	defence			x	x x	x	x	Yamamichi et al., 2011
	defence				x			Kovach-Orr & Fussmann 2013
	defence, selectivity	x				(x) x		Seiler et al. 2017
	defence, offence, selectivity	x				x x	x	Flöder et al. 2018
	defence				x		x	Bianchi et al 2013