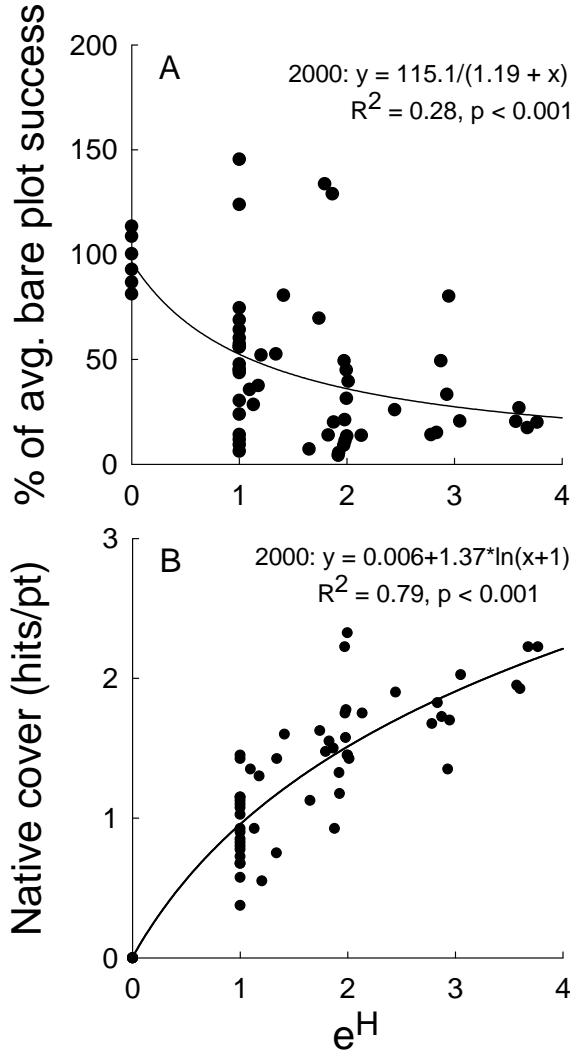
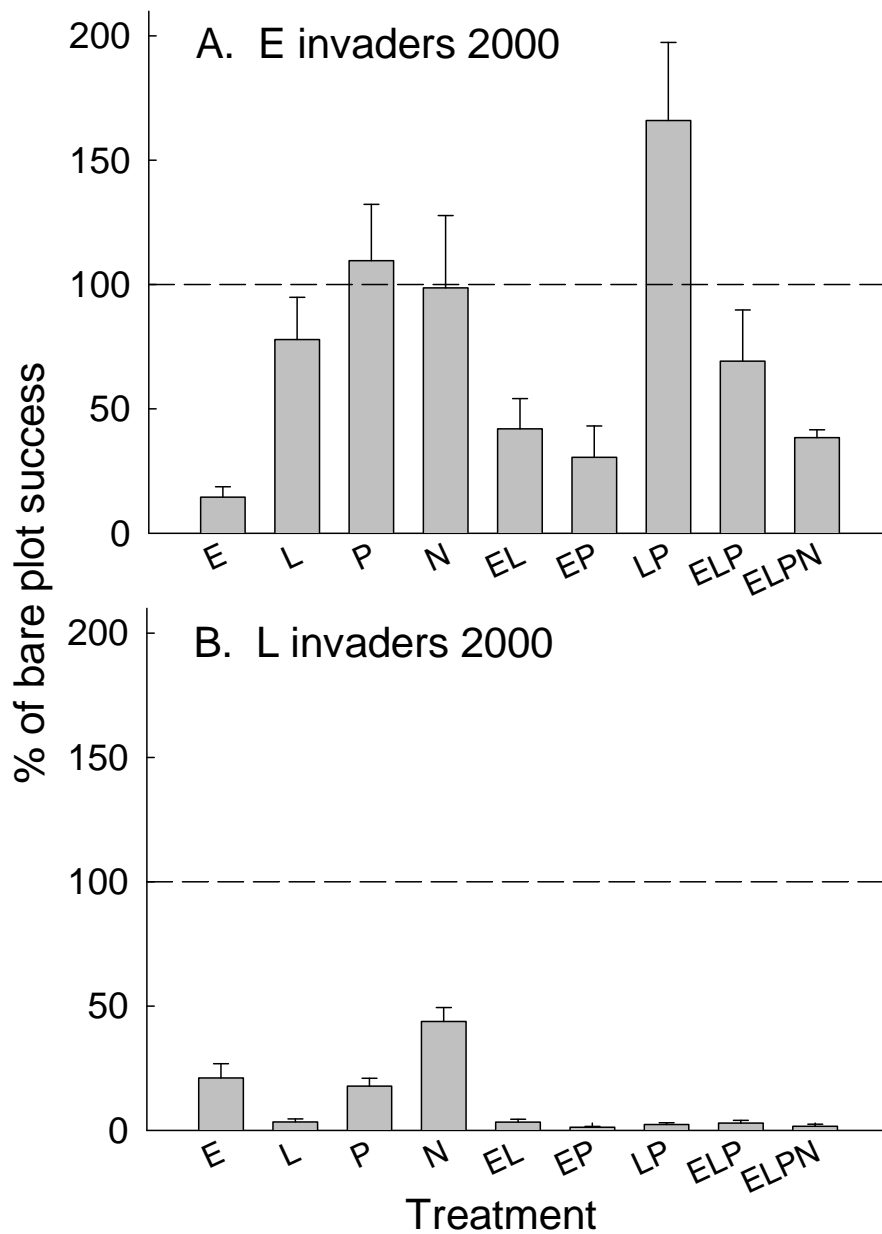


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4 APPENDIX 1 - SUPPLEMENTAL DATA FOR 2000
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8 **Fig. S1.** Effects of functional diversity of the original communities in 2000 on A) aggregate
9 invader success and B) total cover minus invaders. Functional diversity is expressed as e^H ,
10 where H' is the Shannon-Weiner diversity index calculated by functional group. e^H gives the
11 number of equally abundant functional groups that would give the same value of H' as the
12 original community. Aggregate invader success is the average, across all six species of invader,
13 of each invader's proportional success (reproduction or stem length) relative to the mean success
14 of that species in the bare plots (see Methods). Cover data (average number of canopy hits per
15 grid point in the point quadrat method) are for the original planted species only. For data in
16 panel a, linear regression was also significant without bare plots ($61.1 - 11.01 * X$, $n = 53$, $R^2 =$
17 0.06 , $p = 0.048$, $AIC_c = 374.15$); however, nonlinear regressions had slightly lower AIC_c : $Y =$
18 $130.4/(1.54 + X)$, $n = 53$, $R^2 = 0.08$, $AIC_c = 374.05$.



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Fig. S2. Relative success of (A) early season annual and (B) late season annual invaders in 2000 in response to plot functional group composition. E = early season annuals, L = late season annuals, P = perennial bunchgrasses, and N = nitrogen-fixers. Dashed line at 100% reflects success of invaders in bare plots. To agglomerate “success” of all invaders within each functional group, we first normalized the reproductive output or biomass of each invader by the average reproductive output of that invader in the bare plots. We then averaged the normalized success of all invaders within a given functional group in each plot. Shown are the means and standard errors across replicate plots (n=6) of all the normalized, agglomerated reproductive output or biomass for each functional group treatment. Statistics are shown in Table S1.

31 **Table S1.** ANOVA results for relative success of E and L invaders (average success of all species in each group) in
 32 2000. Treatment means shown in Figure S2. Direction and relative strength of significant effects are indicated by
 33 arrows: up arrows = functional group increases success of invaders, down arrows = functional group decreases success
 34 of invaders, two arrows indicates a stronger effect than one arrow. Significance indicated by stars: ~ = $p < 0.1$, * = $p <$
 35 0.05 , ** = $p < 0.01$, *** = $p < 0.001$.
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	All Es	All Ls
r^2, n	0.70, 60	0.89, 59
BLK	ns	*
E	↓***	↓***
L	↑** ^a	↓***
P	↑**	↓***
N	ns	↓**
ExL	R** ^a	↓B*** ^b
ExP	ns	ns ^c
LxP	ns	↓B*** ^d
ExLxP	ns	ns
ExLxPxN	ns	ns

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 38 ^aReduced main effect: reduction of E invader success by Es in the original community (E, EP) is not as great with Ls
 39 also in the original community (EL, ELP, ELPN), but there was no positive effect of Ls alone (L, LP) on E invader
 40 success.

41 ^bBasement effect: E and L effects are not additive – adding Es (EL, ELP, ELPN) did not reduce invader success any
 42 more than Ls alone (L, LP).

43 ^cE, P effects were additive in 2000, implying complementarity.

44 ^dBasement effect: L, P effects were not additive – adding Ps (LP, ELP, ELPN) did not reduce invader success any more
 45 than Ls alone (L, LP).

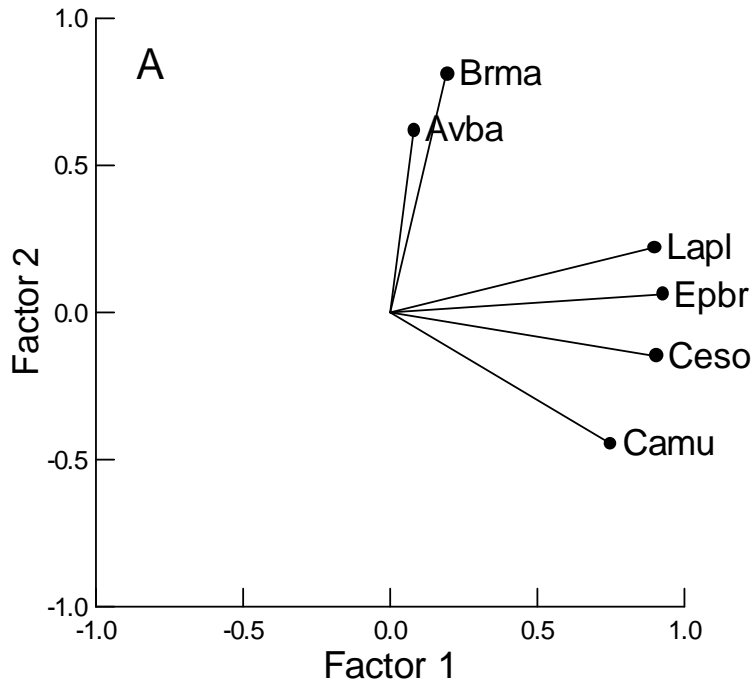
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Table S2. Correlation coefficients for normalized reproductive success among individual invading species in 2000 and 2001. Functional group for each species is shown in parentheses. Significance by Dunn-Šidak correction for $P < 0.10 = \sim$; $P < 0.05 = *$; $P < 0.01 = **$; $P < 0.001 = ***$. Analyses done on natural log transformed normalized success for each species. Species abbreviations as in Table 1.

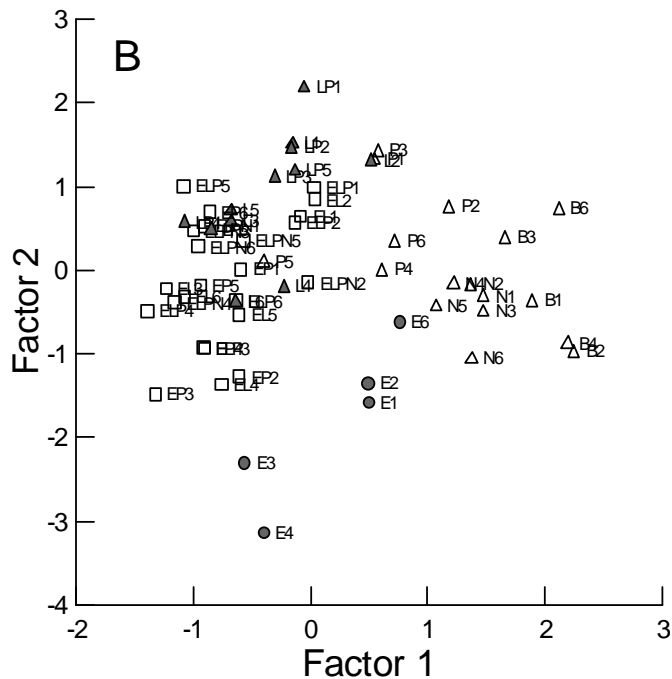
	Av ba (E)	Br ma (E)	La pl (E)	Ca mu (L)	Ce so (L)
2000					
Br ma (E)	0.153				
La pl (E)	0.099	0.356~			
Ca mu (L)	-0.104	-0.161	0.496**		
Ce so (L)	0.021	0.009	0.760***	0.641***	
Eb br (L)	0.114	0.199	0.799***	0.620***	0.773***
2001					
Br ma (E)	0.567***				
La pl (E)	0.259	0.336			
Ca mu (L)	-0.008	-0.055	0.583***		
Ce so (L)	0.015	-0.017	0.741***	0.728***	
Eb br (L)	0.269	0.230	0.676***	0.695***	0.734***

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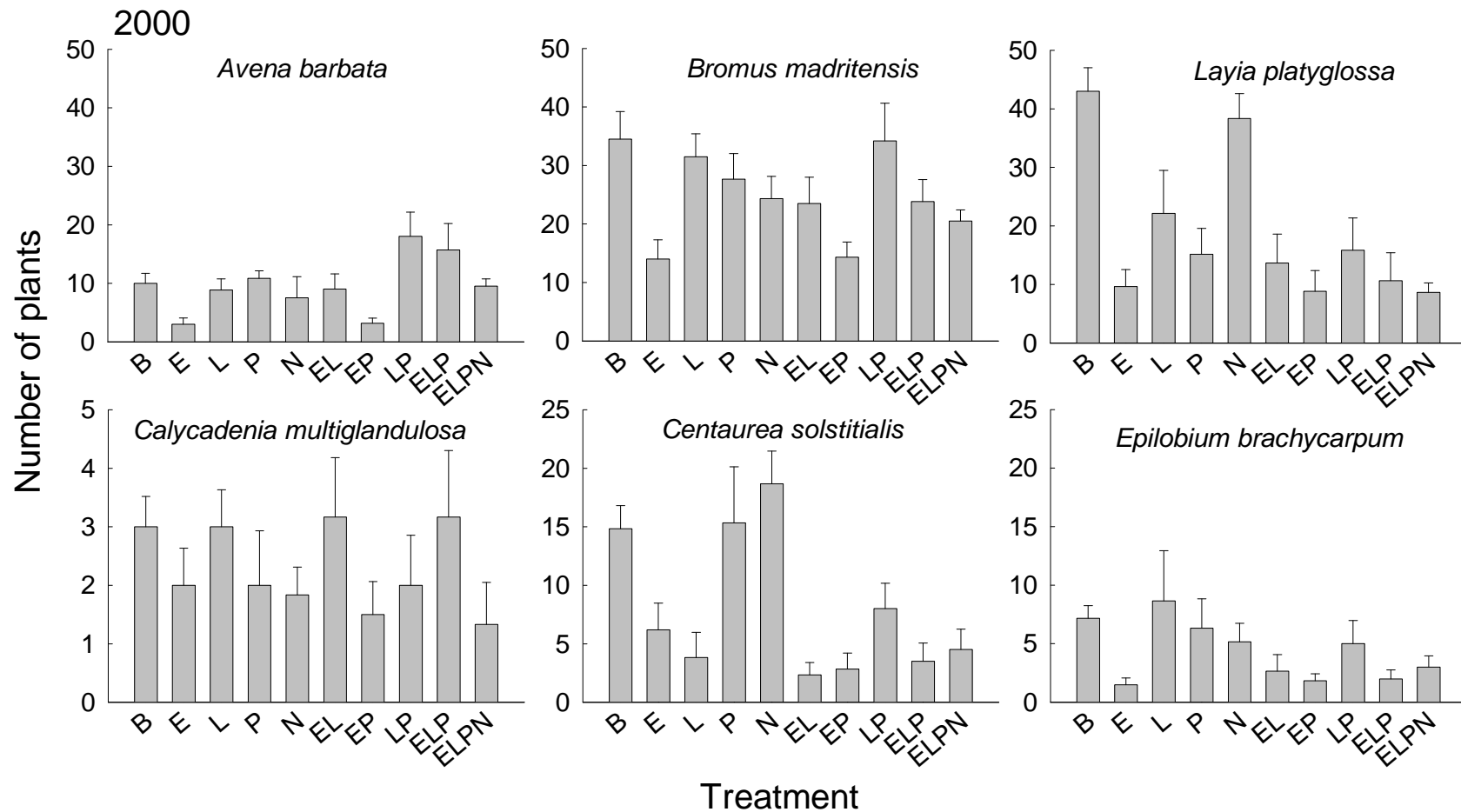


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58 **Fig. S3.** (A) Loadings for PC axes 1 and 2 for all invader species in 2000. (B) Clustering of
 59 original communities on PC axes 1 and 2 according to invader success in 2000, following the
 60 factor loadings shown in A. Species abbreviations in A as in Table 1. Plot labels are shown for
 61 all points in B. Different symbol styles identify different treatment types for clarity: triangles =
 62 B, P, and N; filled circles = E; filled triangles = L and LP; and squares = all E-containing
 63 mixtures (EL, EP, ELP, ELPN). PCA was done using correlation matrices, with no rotation, of
 64 the natural log transformed percent reproductive success of each species.



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68 **Fig. S4.** Seedling establishment of invaders in 2000 in response to functional group composition of the original community.

69 “Number of plants” is the maximum number of individuals found among four censuses. In 2000, the earliest census was in April,

70 when early season annuals were already at peak biomass, and includes only individuals originating from added seeds. The top three

71 panels show the early season annual invaders and the bottom three show the late season annual invaders. Statistics shown in Table S3.

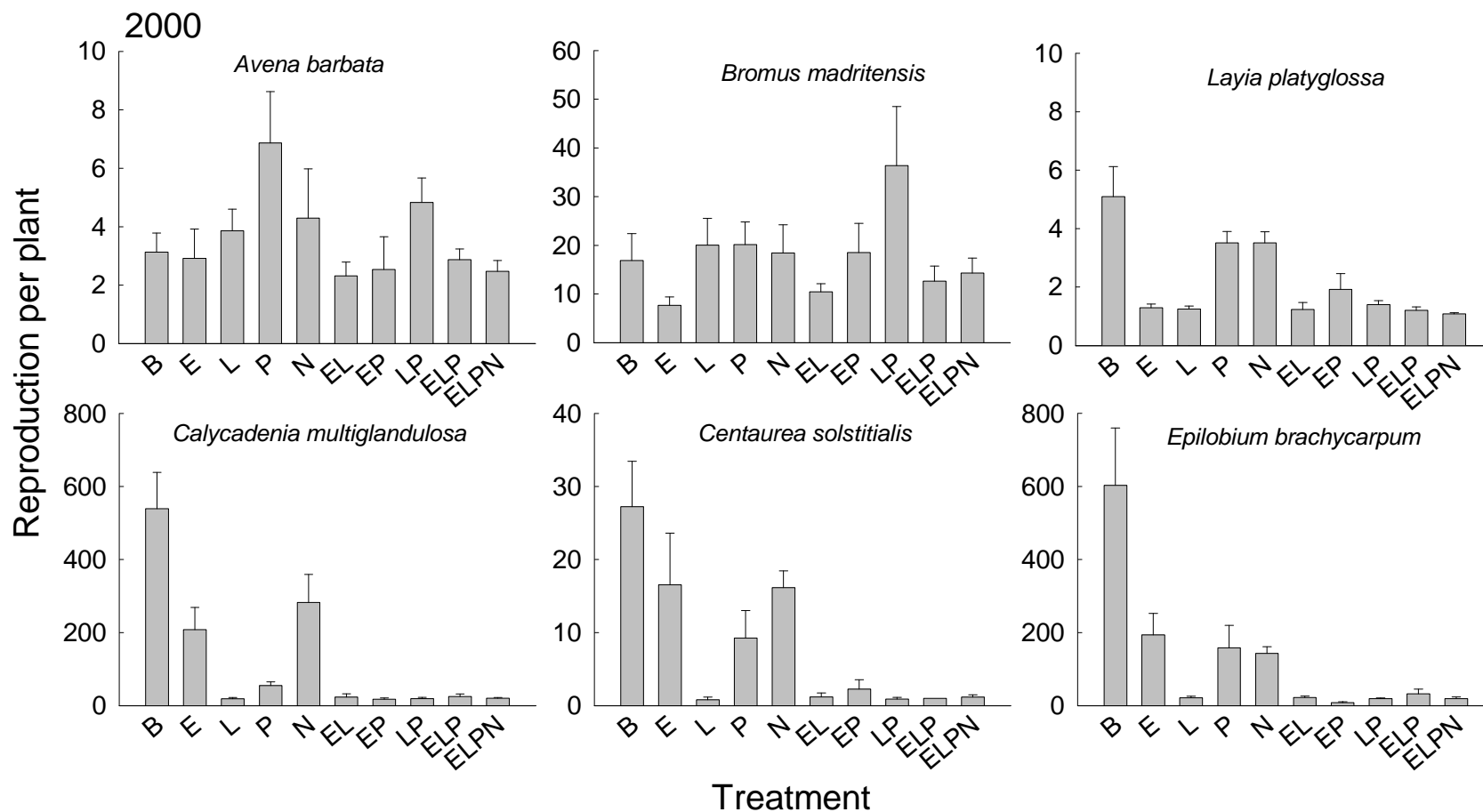
72 Data from 2001 shown in Fig. 5.

73 **Table S3.** ANOVA results for invader seedling establishment in 2000 (data shown in Fig. S4). Results for 2001 are shown in Fig. 5
74 and Table 4. Invader species are arranged according to functional groups and similarities in response to treatments as shown in the
75 PCA (Fig. S3). Data analyzed were maximum number of plants in any measurement as an estimate of number of seeds getting
76 established. All analyses on natural log transformed data to improve homoscedasticity. Direction of effects: ↑, ↓ - addition of that
77 functional group increases or decreases, respectively, abundance of that invader species; number of arrows reflects relative magnitude
78 of main effects within that particular ANOVA only. Interaction types (as illustrated in Fig. 1): E, L, P or N – effect of that functional
79 group only when other group(s) were not present; B – “basement” effect: negative effects of both groups, but not additive in mixture;
80 S – synergism: effects of both groups in mixture stronger than expected based on effects in single group treatments. Levels of
81 statistical significance: ns = not significant ($p > 0.1$), ~ = borderline significant ($0.05 < p < 0.1$), * = $p < 0.05$, ** = $p < 0.01$, *** =
82 $p < 0.001$. Block effects are not shown.

	E Invaders			L Invaders		
	PCA 2 invaders		La pl	PCA 1 invaders		
	Av ba	Br ma		Ep br	Ca mu	Ce so
r^2, n	0.51, 60	0.49, 59	0.73, 60	0.47, 60	0.20, 60	0.64, 59
E	↓↓**	↓↓***	↓***	↓***	ns	↓***
L	↑**	↓*	ns	ns	ns	↓**
P	↑~	ns	↓***	ns	ns	ns
N	↓~	ns	ns	ns	ns	ns
ExL	↓E**	↓E~ ^a	↓B _E ~	ns	ns	↓B*
ExP	ns	ns	ns	ns	ns	ns
LxP	ns	ns	ns	ns	ns	↓L*
ExLxP	ns	ns	ns	ns	ns	ns
ExLxPxN	ns	ns	ns	ns	ns	ns

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85 ^a Negative effects of Es weaker in presence of Ls

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89 **Fig. S5.** Adult success of invaders in 2000 in response to functional group composition of the original community. Growth per plant
 90 is the maximum average reproductive success for individuals of each species at the time of peak biomass (April for early season
 91 annuals[upper panels], June – Aug. for late season annuals [lower panels]). Reproductive success is estimated differently for each
 92 species: seeds per plant for *Avena* and *Bromus*, flowering heads per plant for *Layia* and *Centaurea*, and total stem length for
 93 *Calycadenia* and *Epilobium*. Statistics shown in Table S4. Results for 2001 are shown in Fig. 6 and Table 5.

94 **Table S4.** ANOVA results for effects of functional group composition on adult success of invaders (growth and reproduction) in 2000
 95 (data shown in Fig. S5). Results for 2001 are shown in Fig. 6 and Table 5. Data were total number of seeds (*Avena* and *Bromus*),
 96 number of flowering heads (*Layia* and *Centaurea*), or total stem length (*Calycadenia* and *Epilobium*) at peak biomass divided by the
 97 total number of individuals in that census period. Grouping and symbols as in Table S3. All analyses on natural log transformed data
 98 to improve homoscedasticity.
 99

	E Invaders			L Invaders		
	PCA 2 invaders		La pl	PCA 1 invaders		
	Av ba	Br ma		Ep br	Ca mu	Ce so
r^2, n	0.26, 57	0.61, 60	0.76, 60	0.90, 50	0.89, 48	0.83, 50
E	↓↓**	↓↓***	↓***	↓***	↓*	ns
L	ns	ns	↓***	↓↓***	↓↓***	↓↓***
P	ns	↑*	ns	↓***	↓↓***	↓***
N	ns	ns	ns	↓***	↓~	ns
ExL	ns	ns	↓B***	↓B***	↓B**	↓B _L *
ExP	ns	ns	ns	↓S~	ns ^a	ns
LxP	ns	ns	ns	↓B***	↓B***	↓B***
ExLxP	ns	ns	ns	↓S, B*** ^b	ns	ns
ExLxPxN	ns	ns	ns	↓N~ ^c	ns	ns

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^a No interaction indicates that main effects are additive, i.e., complementary.

^b ExP synergism and L basement effect

^c N<B, but ELPN≥ELP