Supplementary materials – Behavioral Ecology and Sociobiology

Effects of wildfires on behavioral dominance dynamics in Spanish ant communities

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S1. VEGETATION COVER

Data analysis

To analyze the vegetation transect data, we used generalized linear models (GLMs; glm function in stats package, R Core Team, 2024) with a binomial distribution, as the dependent variable was the presence or absence of each vegetation stratum, across each vegetation stratum (herbaceous, low shrub, high shrub, and tree). Each model included the main effects of fire treatment (burned or unburned), time since fire (1, 3, or 5 years), and their interaction.

Then we carried out two generalized linear models for each cover type (herbaceous, low shrub, high shrub, and tree) (GLM; *glm* function in *stats* package, R Core Team, 2024). One model focused on the data from the burned plots, and the other model focused on the data from the unburned plots. In the models, the dependent variable was the presence or absence of each cover type at each of the 15 sampling points (binomial distribution). The main independent variable was time since fire (1, 3, or 5 years); when the variable was significant, we carried out pairwise post-hoc comparisons to test for differences among the three variable categories using Fisher's exact tests with Bonferroni correction for multiple testing.

Results

The presence of all vegetation strata was influenced by fire status and time since fire, but the interaction between both factors was only significant for low shrubs (Table S1).

For the burned plots, time since fire had a significant influence on all types of vegetation cover plots (herbaceous: $X^2 = 89.31$, $p < 0.001$; low shrub: $X^2 = 32.92$, $p < 0.001$; high shrub: $X^2 = 14.95$, $p < 0.001$; tree: $X^2 = 16.60$, $p < 0.001$; N = 180 and df = 2 in all cases). The post-hoc tests showed that tree cover and low cover were similarly absent at Gibraleón (1 year since fire) and El Campillo (3 years since fire) ($p > 0.110$) and were significantly more present at Moguer (5 years since fire) ($p < 0.032$ for comparisons with Gibraleón and El Campillo, Table S1). Herbaceous cover differed significantly among the three study sites (burned plots); more specifically, their presence increased with greater time since fire ($p < 0.019$ in all cases, Table S1). High shrub also increased with greater time since fire, but we detected significant differences only the between Gibraleón (1 year since fire) and Moguer (5 year since fire) ($p = 0.014$, Table S1).

For the unburned plots, the vegetation cover provided by high shrubs and trees did not differ with time since fire. Both types of vegetation were consistently present across the full length of the vegetation transects. Because there was no variation in the data, no further analysis was needed (Table S1). However, the presence of herbaceous cover and low shrub cover differed significantly among the three study sites ($X^2 = 114.57$, $p < 0.001$; $X^2 = 33.28$, $p < 0.001$; N = 180 and df = 2, in all cases). The post-hoc analyses showed that the level of herbaceous cover was similarly absent at Gibraleón (1 year since fire) and El Campillo (3 years since fire) ($p = 1.000$). However, herbaceous cover was significantly more present at Moguer (5 years since fire) ($p < 0.001$ for comparisons with Gibraleón and El Campillo). A different pattern was seen for low shrub cover. It was similarly present at Gibraleón (1 year since fire) and Moguer (5 years since fire) ($p = 1.000$) but was significantly less present at El Campillo (3 years since fire) ($p < 0.001$, Table S1).

Table S1 Relative frequency of each vegetation cover type (A) and the results of the statistical models examining the influence of fire status and time since fire on vegetation cover (B)

					Time since fire (study site)			
A			**1 year (Gibraleón)**		**3 years (El Campillo)**		**5 years (Moguer)**	
Vegetation type			Unburned	Burned	Unburned	Burned	Unburned	Burned
Herbaceous			0 ± 0	0 ± 0	0 ± 0	0.77 ± 0.08	1 ± 0	1 ± 0
Low shrub			1 ± 0	0 ± 0	1 ± 0	0.03 ± 0.03	1 ± 0	0.27 ± 0.08
High shrub			1 ± 0	0.4 ± 0.09	0.57 ± 0.09	0.7 ± 0.09	1 ± 0	1 ± 0
Tree			1 ± 0	0 ± 0	1 ± 0	0 ± 0	1 ± 0	0.23 ± 0.08
B	Herbaceous		Low shrub		High shrub		Tree	
	X^2	p	X^2	p	X^2	p	X^2	p
Fire status	236.48	**< 0.001**	184.29	**0.01**	58.52	**< 0.001**	49.20	**< 0.001**
Time	32.60	**< 0.001**	144.66	**< 0.001**	43.56	**< 0.001**	32.60	**< 0.001**
Fire*Time	32.60	1.00	118.09	**< 0.001**	43.56	0.999	32.60	1.00

S2. ANT SPECIES AND BAIT OCCUPATION

Table S2 List of ant species in alphabetical order. Indicated is species-specific occurrence (number of pitfall traps in which each species occurred) and worker abundance (in parentheses, total number of individuals) in the unburned and burned plots at each study site. The species abbreviations are used in Figs. 4, 6, 7, and S2

		Study site (time since fire)					
		Gibraleón (1 year)		El Campillo (3 years)		Moguer (5 years)	
Species	**Abbreviation**	**Unburned**	**Burned**	**Unburned**	**Burned**	**Unburned**	**Burned**
Aphaenogaster gibbosa	aph.gib	11 (24)	13 (39)	21 (66)	9 (14)	3 (3)	
Aphaenogaster iberica	aph.ibe	7 (18)	12 (60)	4 (6)	4 (5)	15 (33)	13 (61)
Aphaenogaster senilis	aph.sen	22 (80)	19 (200)			6 (15)	30 (255)
Camponotus lateralis	cam.lat	4 (4)					
Camponotus pilicornis	cam.pil	6 (48)	16 (87)	2 (6)			1 (1)
Camponotus sylvaticus	cam.syl	3 (51)	4 (14)	1 (1)	1 (1)	4 (4)	
Cataglyphis hispanica	cat.his	3 (5)	29 (181)	25 (164)	18 (29)		
Cataglyphis tartessica	cat.tar					17 (53)	30 (483)
Crematogaster auberti	cre.aub	4 (5)	7 (14)	2 (3)		4 (6)	2 (3)
Crematogaster scutellaris	cre.scu	4 (6)					
Goniomma kugleri	gon.kug		2 (4)	2 (2)	7 (24)		
Iberoformica subrufa	ibe.sub	6 (12)	24 (187)	25 (260)	19 (87)	2 (11)	5 (28)
Lasius grandis	las.gra		7 (14)				
Messor barbarus	mes.bar		1 (1)				2 (2)
Messor bouvieri	mes.bou		2 (34)				
Messor lusitanicus	mes.lus						9 (165)
Messor marocanus	mes.mar						5 (277)
Myrmica aloba	myr.alo		1 (7)				
Oxyopomyrmex saulcyi	oxy.sau	2 (2)	1 (2)			1 (1)	2 (2)
Pheidole pallidula	phe.pal		5 (72)			1 (3)	3 (24)
Plagiolepis pygmaea	pla.pyg		4 (29)	14 (64)	11 (73)	1 (1)	
Plagiolepis schmitzii	pla.sch	1 (12)	4 (6)	1 (2)			1 (1)
Solenopsis sp	sol.sp	6 (17)	1 (2)	7 (13)	1 (1)	6 (22)	2 (2)
Tapinoma nigerrimum	tap.nig		1 (1)			1 (1)	
Temnothorax racovitzai	tem.rac	4 (11)	2 (2)	2 (2)		3 (19)	
Tetramorium caespitum	tet.cae	7 (17)	16 (42)	2 (24)	2 (6)		
Tetramorium forte	tet.for	2 (28)	3 (6)				5 (61)
Tetramorium semilaeve	tet.sem	1 (1)	4 (5)	8 (28)	7 (26)	6 (12)	6 (14)

Figure S1 Total number of occupied baits in the burned plots (gray bars) and unburned plots (white bars) at the different sampling time points (from 5 to 120 min) during the bait trials conducted at three times of day: morning (8:00–10:00), midday (13:00–15:00), and afternoon (18:00–20:00). Data are shown for the most commonly occurring ant species

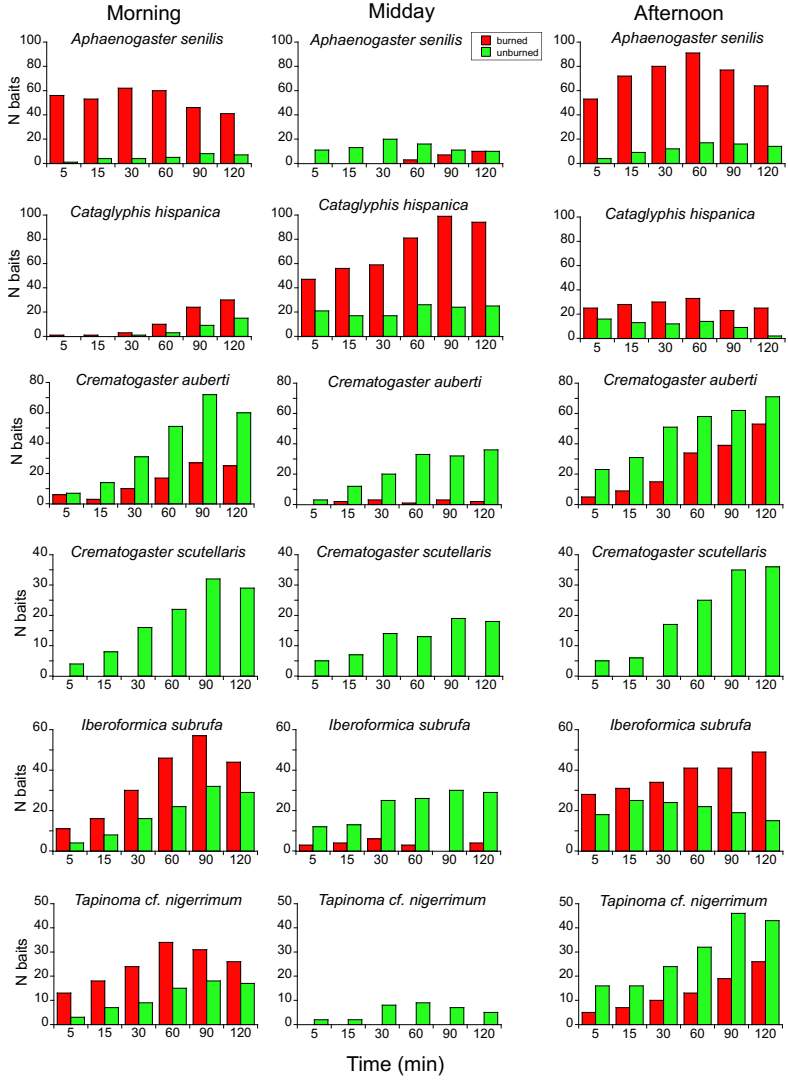


Figure S2 Percent occupation of the different bait types (salt, seeds, sugar, tuna, water) by the most commonly occurring ant species in the burned (B) plots and the unburned (UB) plots. The values at the top of the bars indicate the total number of occupied baits in each case. Species abbreviations are indicated in Table S2. The first and second graphs show the results for the ecologically dominant species (as defined in the Arnan et al. 2012), with the exception of *Plagiolepis pygmaea* (pla.pyg). The third graph shows the results for the ecologically subordinate species

