





Safety of Entomopathogenic Fungi

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POTENTIAL ADVERSE EFFECTS THAT MAY BE POSSED BY THE ENTOMOPATHOGENIC FUNGI

- 1. Allergenicity to humans and other animals**
- 2. Displacement of nontarget organisms**
- 3. Toxicogenicity to nontarget organisms**
- 4. Pathogenicity to nontarget organisms**



Fungal Locust Control in Spain



Indigenous

Beuveria bassiana EABb 90/2-Dm





ESLOCO

***Environmentally Sustainable
Locust and Grasshopper Control***

2002

Non-Indigenous

***Metarhizium anisopliae
var. *acridum*
“Green muscle”***





Displacement of non-target organisms

194 soil samples

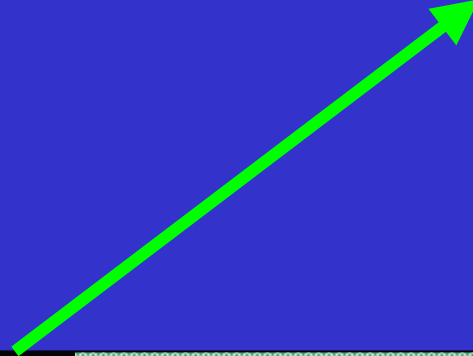
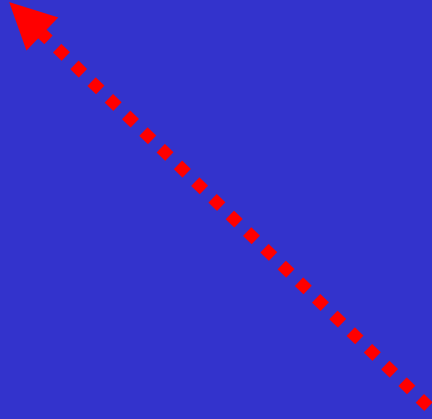
150 positive samples

**89 *B. bassiana*
samples**

**8 *M. anisopliae*
samples**

**53 *B. bassiana* +
M. anisopliae
samples**





M. anisopliae



B. bassiana



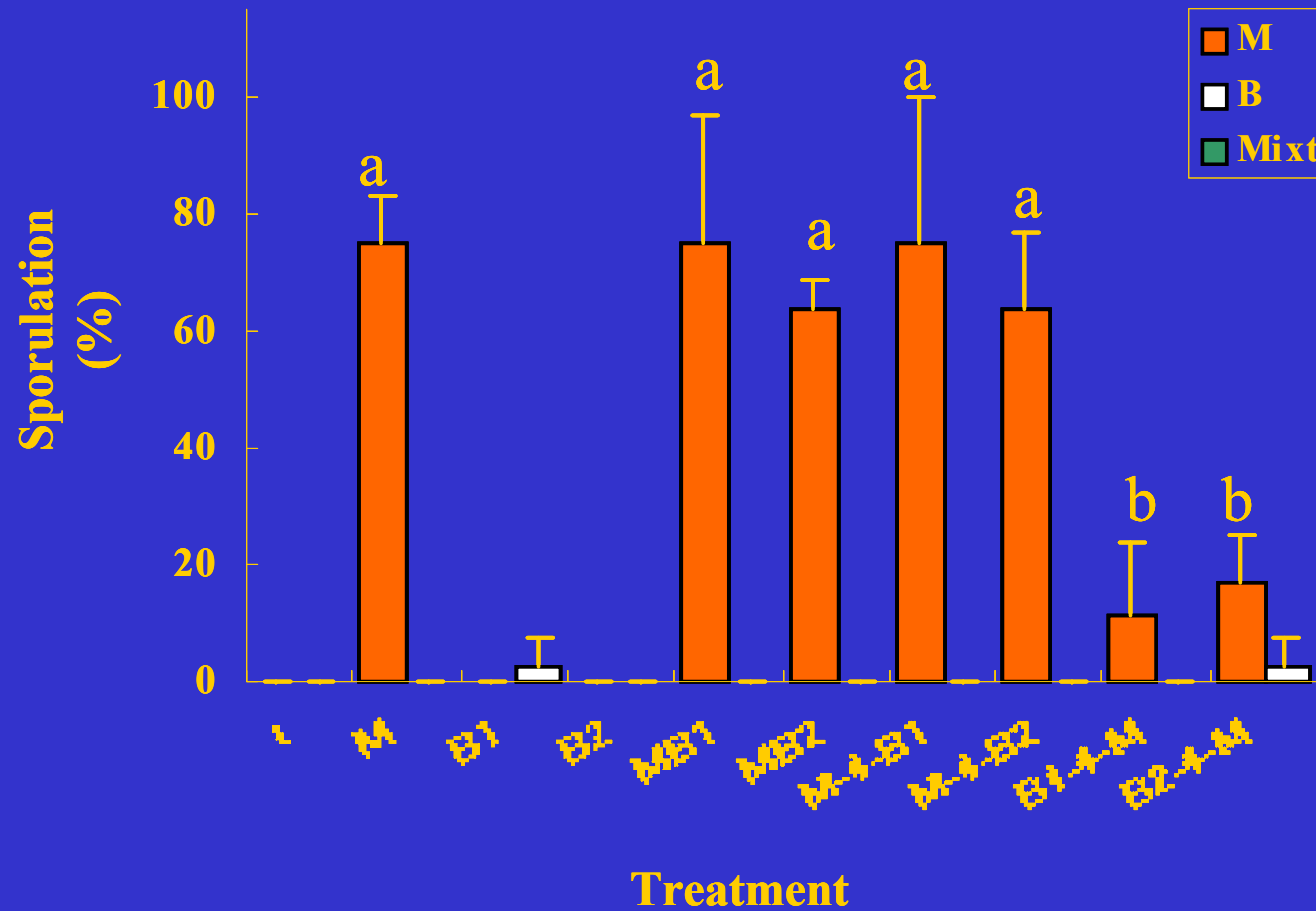
Entomopathogenic Fungi isolated from areas treated with *M. anisopliae* var. *acridum* (5×10^{12} spores/ha)

Days after treatment	Location	Fungi isolated	
		Control plot	Treated plot
0	Castuera	Bb	ns
2		0	Ma acr
7		Bb	0
40		Bb	Bb
0	Cabeza del Buey	0	ns
2		0	Ma acr
7		ns	Bb
40		ns	Bb, Ma

Ns= no sampling, 0= no fungi detected; Bb= *Beauveria bassiana*; Ma acr= *Metarhizium anisopliae* var. *acridum*; Ma= *Metarhizium anisopliae*



30°C



Mean \pm S.D. Values with the same letter are not significantly different. LSD Test ($P > 0.05$)



Toxicogenicity to non-target organisms

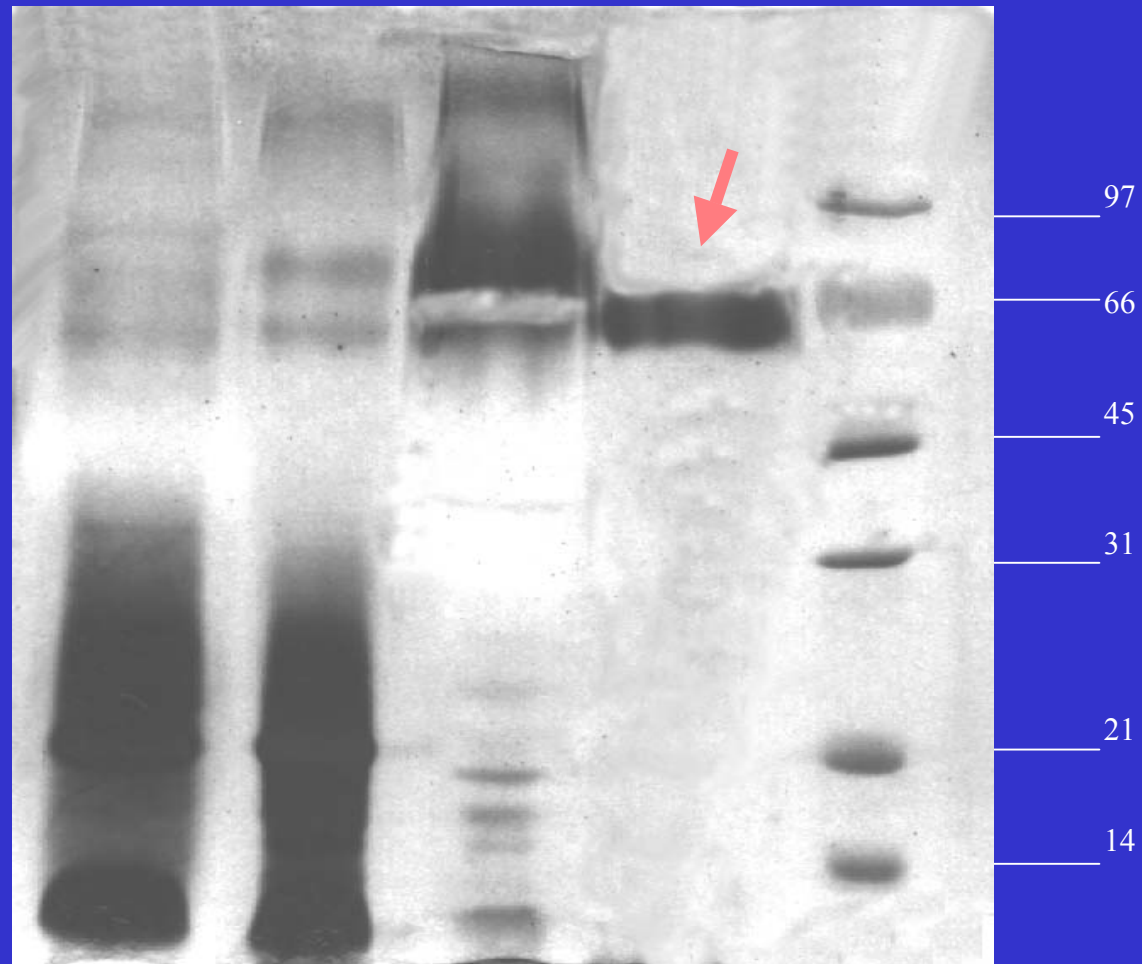


Susceptibility of fourth instar nymphs of *L. migratoria* to different strains of *B. bassiana* and to different sources prepared from their cultures in Adamek's liquid medium

Strain	Mean mortality (%± SD)			
	Conidia	Crude filtrate	Adialysate	Dialysate
EABb 90/2-Dm	57.5 ± 9.3 a	56.3 ± 4.4 a	60.0 ± 7.5 a	4.2 ± 1.8 a
EABb 91/6-Ci	61.3 ± 5.8 a	14.4 ± 3.2 b	8.1 ± 2.5 b	5.6 ± 3.2 a
EABb 91/7-Dm	78.8 ± 6.9 b	11.3 ± 3.5 bc	8.8 ± 4.3 b	6.3 ± 2.3 a
EABb 92/10-Dm	0.0 c	11.3 ± 2.3 bc	11.2 ± 3.5 b	5.0 ± 2.6 a
EABb 92/11-Dm	61.9 ± 5.9 a	48.8 ± 6.9 d	52.5 ± 5.9 c	4.3 ± 1.7 a
EABb 0023-Su	94.4 ± 4.9 d	35.0 ± 5.3 e	10.0 ± 2.6 b	10.6 ± 4.9 b
EABb 0026-Su	90.0 ± 7.5 d	10.6 ± 3.2 bc	12.5 ± 1.5 b	5.0 ± 3.8 a
Control	5.6 ± 1.7 e	7.5 ± 2.6 c	6.8 ± 2.5 b	4.5 ± 2.8 a

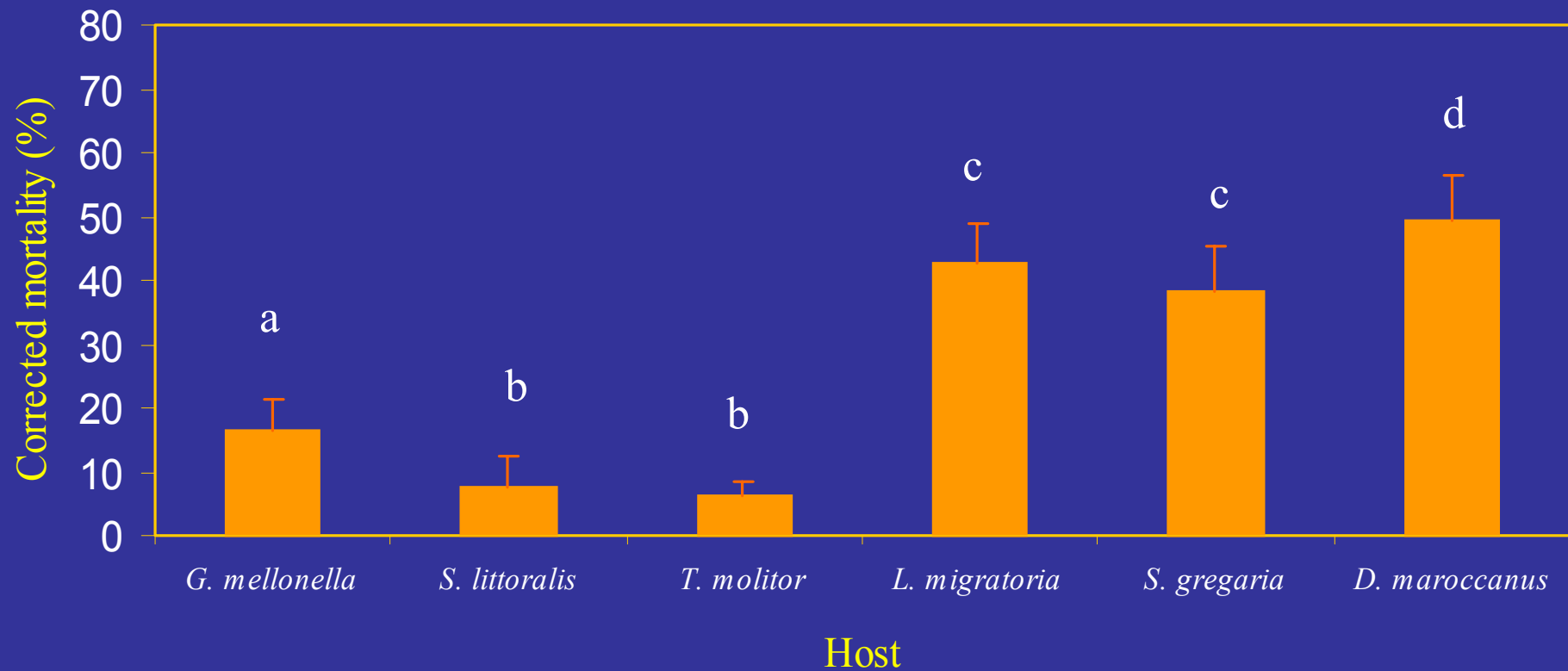


Purification Steps of the Bassiacridin





Corrected mortality of different insect hosts after injection in the hemocoel of $2.8 \mu\text{g g}^{-1}$ of Bassiacridin.



Pathogenicity to non- target organisms



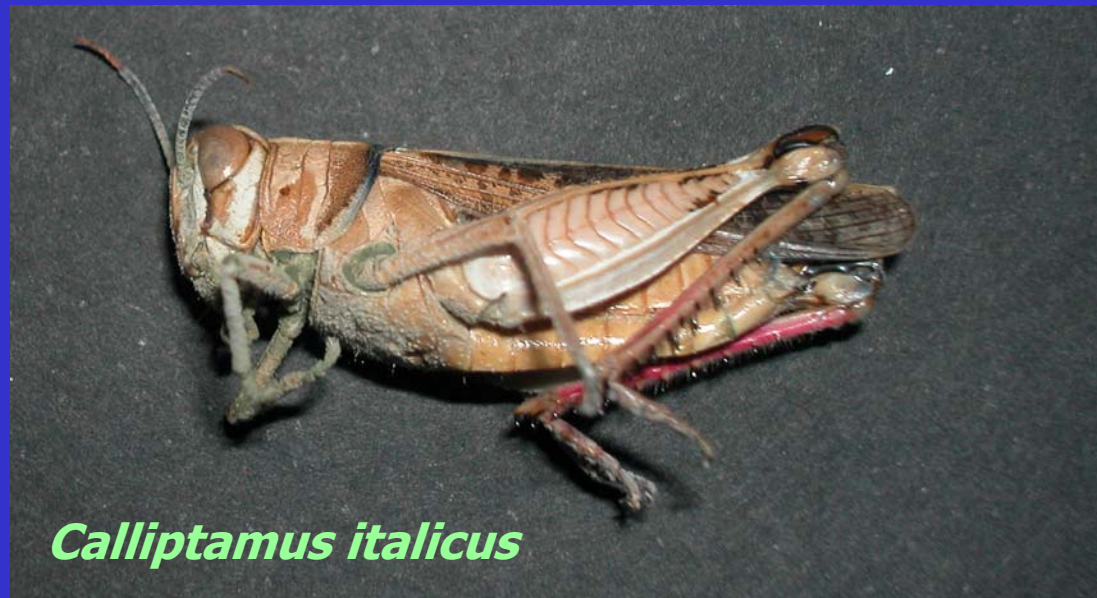
Metarhizium anisopliae
var. *acridum*
“Green muscle”



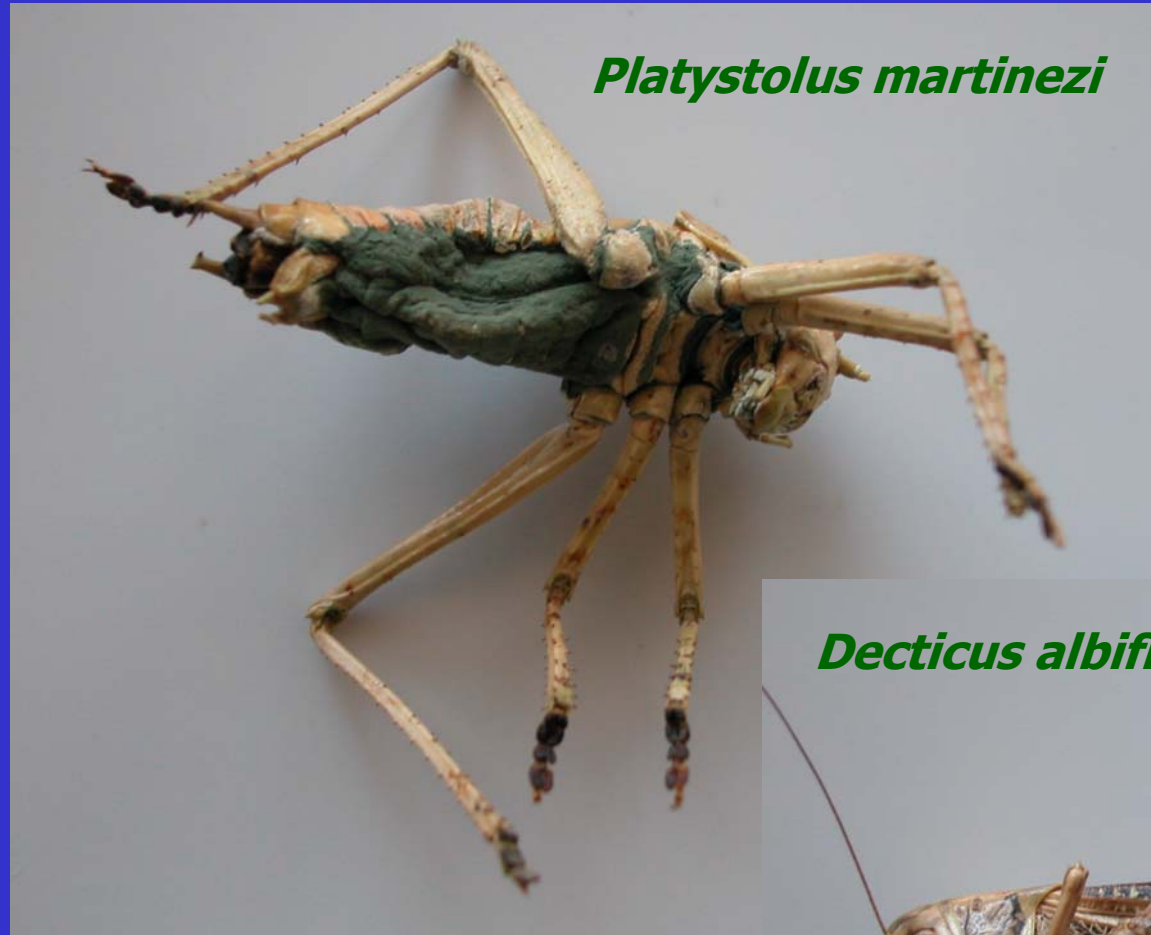
Dociostaurus genei



Dociostaurus maroccanus



Calliptamus italicus



Platystolus martinezi



Decticus albifrons



Scarabeidae



Tenebrionidae





Trichodes sp.



Formicidae



Apidae

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