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Variation in virulence of *Beauveria bassiana* and *B. pseudobassiana* to the pine weevil *Pissodes nemorensis* in relation to mycelium characteristics and virulence genes

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1 **Variation in virulence of *Beauveria bassiana* and *B.***  
2 ***pseudobassiana* to the pine weevil *Pissodes nemorensis* in**  
3 **relation to mycelium characteristics and virulence genes**

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12 **ABSTRACT**

13 Entomopathogenic fungi such as *Beauveria* spp. have potential applications in the biocontrol of insect pests but little is  
14 known regarding their infectivity to the pine weevil *Pissodes nemorensis*. In this study, five isolates of *Beauveria*  
15 *pseudobassiana* and five isolates of *B. bassiana* were tested for characteristics correlating with virulence on *P.*  
16 *nemorensis*. Isolate UAMH301 had the lowest mean lethal concentration value whereas the highest value was obtained  
17 with isolate LRC137. Growth rate was negatively correlated with virulence in *B. bassiana*, because isolate LRC137, the  
18 least virulent isolate, grew much more rapidly than the other *B. bassiana* isolates on SDYA. In contrast, its growth on a  
19 hyperosmotic medium was the slowest. Sporulation rate and conidial area were not correlated with virulence. Mycelial  
20 cell density was positively correlated with virulence in both species, and the four tested genes appear to be one-copy  
21 genes. *Bbchit1* and *Bbhog1*, genes respectively encoding a chitinase and a protein kinase, induced relative expression  
22 levels were positively correlated with virulence in *B. pseudobassiana*. We discuss in terms of previous morphological,  
23 physiological and genetic parameters related to virulence in *Beauveria* and the importance of testing the expression of  
24 putative virulence genes in comparison with their basal transcript levels.

25 **Keywords**

26 *Beauveria* spp.  
27 interseptal distance  
28 genes expression  
29 mycelium growth  
30 *Pissodes nemorensis*

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