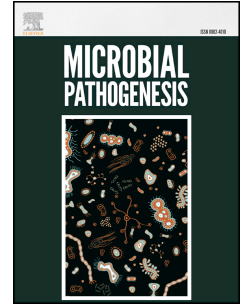


Accepted Manuscript

Strigolactones promote rhizobial interaction and increase nodulation in soybean (*Glycine max*)

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PII: S0882-4010(17)31486-9

DOI: [10.1016/j.micpath.2017.11.049](https://doi.org/10.1016/j.micpath.2017.11.049)

Reference: YMPAT 2616

To appear in: *Microbial Pathogenesis*

Received Date: 11 November 2017

Revised Date: 23 November 2017

Accepted Date: 24 November 2017

Please cite this article as: Rehman N, Ali M, Ahmad MZ, Liang G, Zhao J, Strigolactones promote rhizobial interaction and increase nodulation in soybean (*Glycine max*), *Microbial Pathogenesis* (2017), doi: 10.1016/j.micpath.2017.11.049.

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1 **Strigolactones promote rhizobial interaction and increase nodulation in**
2 **soybean (*Glycine max*)**

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10 **Abstract:**

11 Strigolactones (SLs) play an important role in controlling root growth, shoot branching, and
12 plant-symbionts interaction. Despite the importance, the components of SL biosynthesis and
13 signaling have not been unequivocally explored in soybean. Here we identified the putative
14 components of SL synthesis enzymes *GmMAX1a* and *GmMAX4a* with tissue expression patterns
15 and were apparently regulated by rhizobia infection and changed during nodule development.
16 *GmMAX1a* and *GmMAX4a* were further characterized in soybean nodulation with knockdown
17 transgenic hairy roots. *GmMAX1a* and *GmMAX4a* knockdown lines exhibit decreased nodule
18 number and expression levels of several nodulation genes required for nodule development.
19 Hormone analysis showed that *GmMAX1a* and *GmMAX4a* knockdown hairy roots had increased
20 physiological level of ABA and JA but significantly decreased auxin content. This study not only
21 revealed the conservation of SL biosynthesis but also showed close interactions between SL and
22 other hormone signaling in controlling plant development and legume-rhizobia interaction.

23 **Keywords: Strigolactones, rhizobia interaction, hormone biosynthesis, GmMAX1,**
24 **GmMAX4, soybean nodulation.**

25 **Introduction**

26 Strigolactone (SLs) the currently emerging hormones and a novel group of terpenoid
27 lactone derived from carotenoid, were first recognized as a constituent of root secretion for

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