

## 蚯蚓活动对金发草修复土壤菲芘污染的强化作用

Enhanced dissipation of phenanthrene and pyrene in soils growing *Pogonatherum paniceum* by inoculating earthworms

中文关键词: [植物修复](#) [多环芳烃](#) [菲](#) [芘](#) [金发草](#) [蚯蚓](#)

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作者	单位	E-mail
<a href="#">潘声旺</a>	<a href="#">1.成都大学.城乡建设学院; 2.西南大学.资源环境学院</a>	<a href="mailto:panwang@swu.edu.cn">panwang@swu.edu.cn</a>
<a href="#">魏世强</a>	<a href="#">西南大学资源环境学院, 重庆市农业资源与环境研究重点实验室</a>	<a href="mailto:sqwei@swu.edu.cn">sqwei@swu.edu.cn</a>
<a href="#">袁馨</a>	<a href="#">西南大学资源环境学院, 重庆市农业资源与环境研究重点实验室</a>	
<a href="#">曹生宪</a>	<a href="#">西南大学资源环境学院, 重庆市农业资源与环境研究重点实验室</a>	

### 中文摘要:

采用盆栽试验法,研究了蚯蚓(*Pheretima* sp.)对金发草(*Pogonatherum paniceum* L.)修复菲、芘污染土壤的强化作用。结果显示,在试验浓度范围(20~322.06 mg·kg<sup>-1</sup>)内,蚯蚓活动促进了菲、芘污染土壤中金发草的生长,其根冠比明显增大。添加蚯蚓70d后,种植金发草的土壤中菲、芘的平均去除率高达76.97%、70.60%,平均去除率分别比无蚯蚓作用时(68.66%、61.16%)增长了8.31%、9.45%;相同污染水平下,蚯蚓活动对芘的强化去除程度总是大于菲。各修复因子中,植物-微生物交互作用对菲、芘去除的平均贡献率(46.59%、42.78%)最为突出,分别比无蚯蚓活动时(41.56%、36.64%)增长了5.03%、6.14%。说明蚯蚓活动可强化土壤-植物系统对土壤中菲、芘污染的去作用。

### 英文摘要:

Enhancement effect of earthworm (*Pheretima* sp.) inoculation on the remediation efficiency of soil phenanthrene (Phe) and pyrene (Pye) pollution by *Pogonatherum paniceum* was studied by pot experiments in a green house. Results showed that earthworm activity promoted the growth of *Pogonatherum paniceum* in soils with initial concentrations of Phe and Pye ranging from 20.05 to 322.06 mg·kg<sup>-1</sup>, and apparently increased the biomass ratios of root to shoot of the grass. After a 70-day earthworm inoculation, averagely 76.7% of Phe and 70.6% of Pye were removed from the soils planted grass, which were 8.31% and 9.45% higher than those without earthworm inoculation, respectively. Earthworm activity showed higher enhancement effect for the remediation of Pye than for Phe at the same pollution level. Among all possible pathways, the plant-microbial interaction was proved to be the primary means of PAHs degradation, either with or without earthworm activity, and its contribution to the removal of Phe and Pyr in planted soils accounted for up to 46.59% and 42.78% of the total removal, which were 5.03% and 6.14% higher than those in corresponding soils without earthworm (with 41.56% degradation for Phe and 36.64% for Pyr). Results suggested a feasible way for the establishment of high efficiency phytoremediation of soil PAHs pollution by inoculating earthworms, especially for those PAHs with more benzene rings in their molecular structures.

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地址：南京市北京东路71号 邮编：210008 Email: actapedo@issas.ac.cn

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