

Seabuckthorn Stem Wilt Caused by *Fusarium* spp. in China

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- 1. Pathogen identification**
- 2. Disease resistance**
- 3. Detection**
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- Location : Seedling nursery in Qinghai province (2018)
- 10 cultivars : SBT (*Hippophae rhamnoides* spp. *mongolica*) induced from Russia

Mortality > 90%



- **Location : Seedling nursery in Gansu province (2019)**
- **12cultivars : SBT induced from Russia**

Mortality >60%



- Location : Seedling nursery in Heilongjiang province (2019)
- 10 cultivars : SBT induced from Russia

Mortality >70%



- **Location: Seedling nursery in Liaoning province (2019)**
- **10cultivars : SBT induced from Russia**

Mortality: > 60%



Xinjiang (2019)

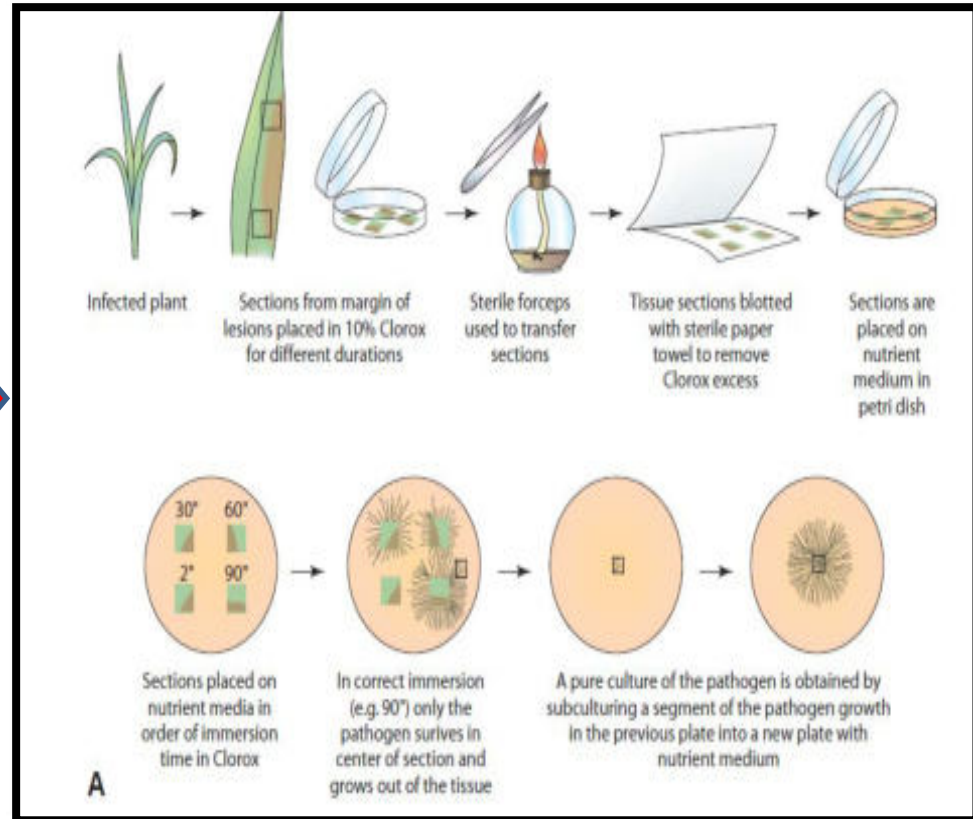


8-year-old infected trees

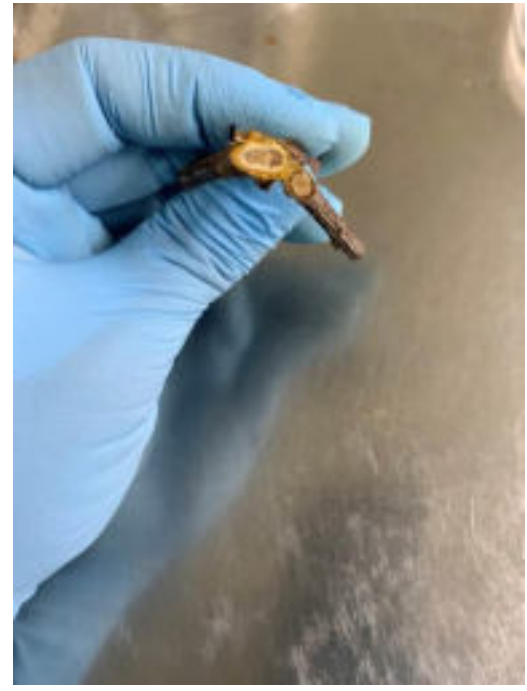
◆ Seabuckthorn Stem Wilt

- The symptoms include massive chlorosis, drooping leaves and dried-up stems on infected trees.
- Distribution: Heilongjiang, Liaoning, Neimeng, Gansu, Xinjiang, Qinghai province.





Pieces of tree roots and stems with brown discoloration in the xylem vessels were selected.





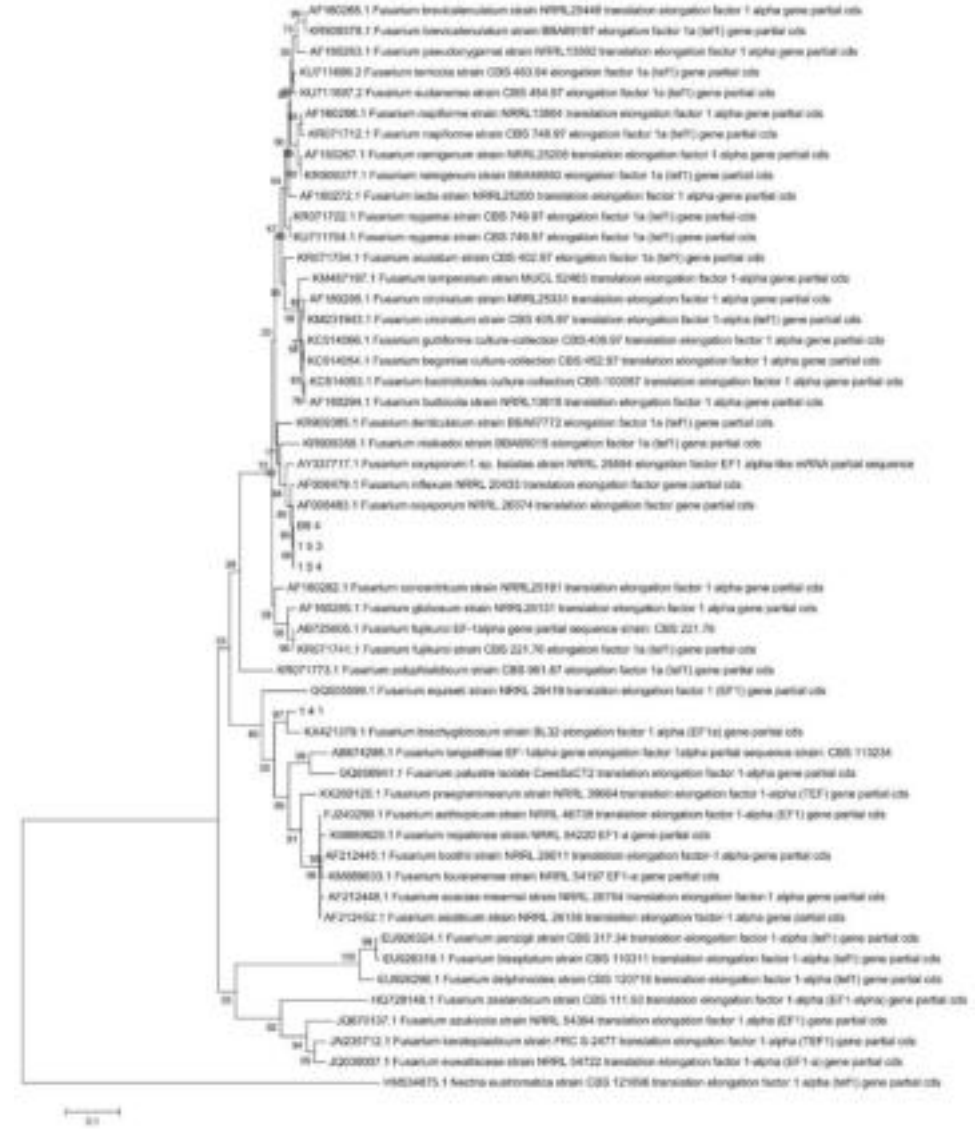
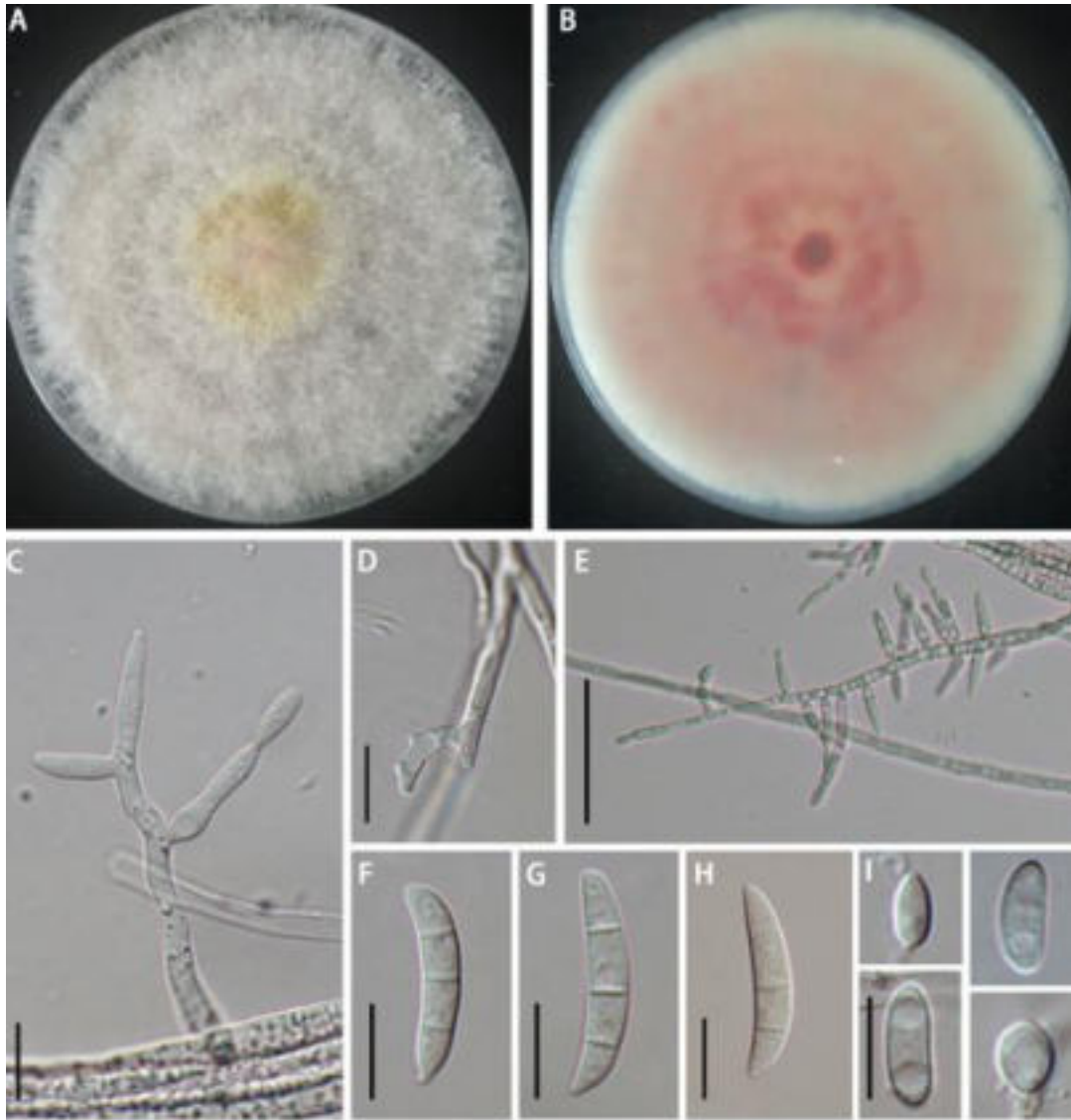
- Pathogenicity tests were performed on healthy, potted 1-year-old seabuckthorn seedlings (cv. eshi05) using three isolates in a greenhouse.



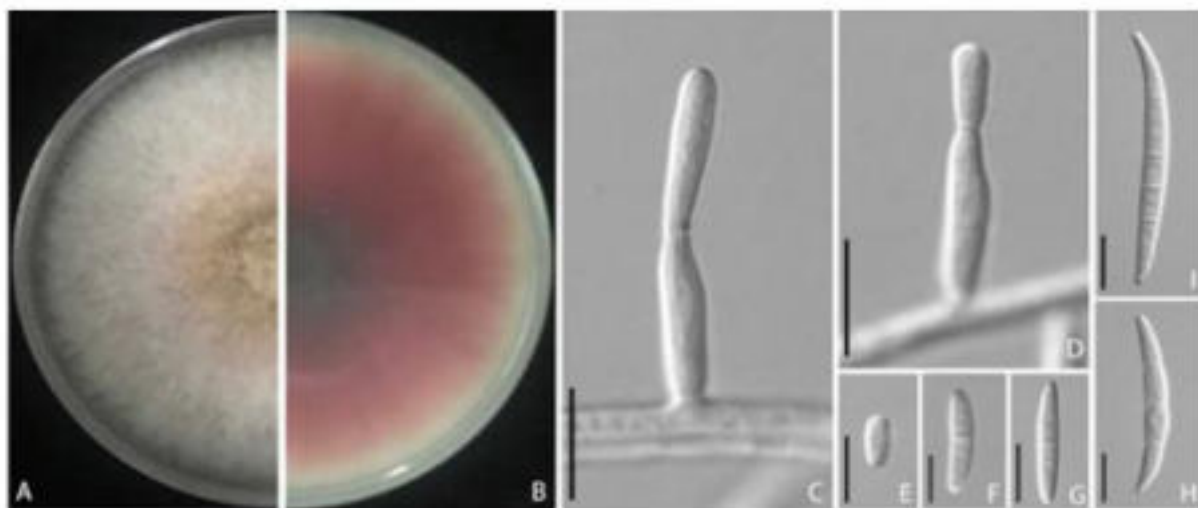
CK



Inoculated seabuckthorn



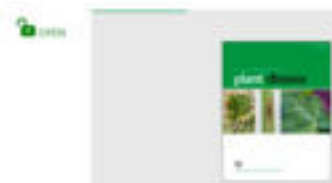
Single most-parsimonious phylogram ML-tree based on the combined analysis of EF-1a gene sequences.



First Report of Sea buckthorn Stem Wilt Caused by *Fusarium proliferatum* in Liaoning, China

Bo Xia, Dongwei Zhang, Yaohua Wu, Jiansheng Hu, Yue Liang, Jianping Hu, Yan Feng Han, and Yue Liang

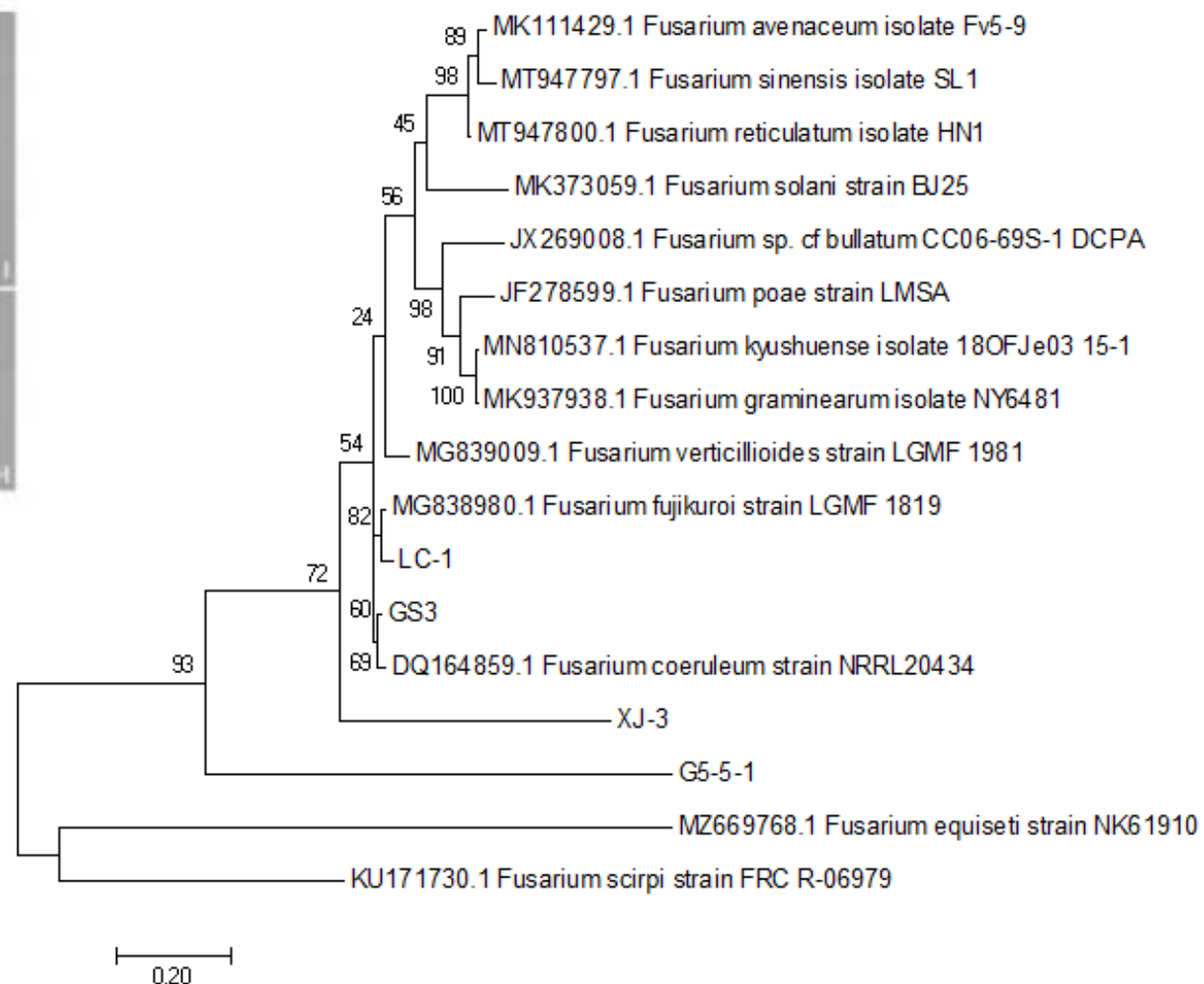
Published Online: 1 Nov 2021 | <https://doi.org/10.1094/PDIS-09/21-1185-PDF>



First Report of Sea buckthorn Stem Wilt Caused by *Fusarium sporotrichioides* in Gansu, China

Bo Xia, Yue Liang, Jiansheng Hu, Xiaoling Yan, Liqiang Yin, Yue Chen, Jianping Hu, Dongwei Zhang, and Yaohua Wu

Published Online: 22 Jun 2021 | <https://doi.org/10.1094/PDIS-03/21-0627-PDF>



◆ Conclusion

- Seabuckthorn stem wilt is a systemic infection disease caused by *Fusarium spp.* In China.
- Seabuckthorn stem wilt caused by *F. proliferatum* in Liaoning province, caused by *F. sporotrichioides* in Gansu province, and caused by *F. oxysporum* in Xinjiang , China.

■ Disease resistance of SBT cultivars

Disease Index survey



201301



201302



201305



201308



201309



2013010



Hybrid SBT 54



Hybrid male SBT 1



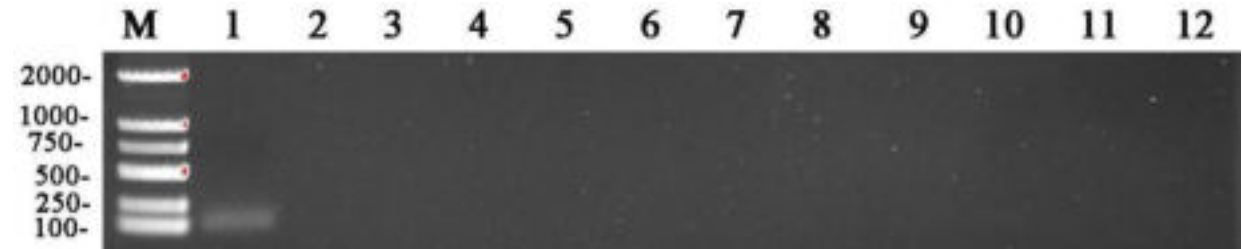
◆ Conclusion

- **High resistant cultivars:** native Chinese SBT (*Hippophae rhamnoides sinensis*)
- Resistant cultivars : SBT introduced from Russia (4 cultivars) ; hybrid SBT from China SBT and Russia SBT (4 cultivars)
- Middle resistant cultivars : SBT introduced from Russia (5 cultivars)
- **Susceptible cultivars:** SBT introduced from Russia (4 cultivars)

Construction of a quantitative detection system for seabuckthorn stem wilt

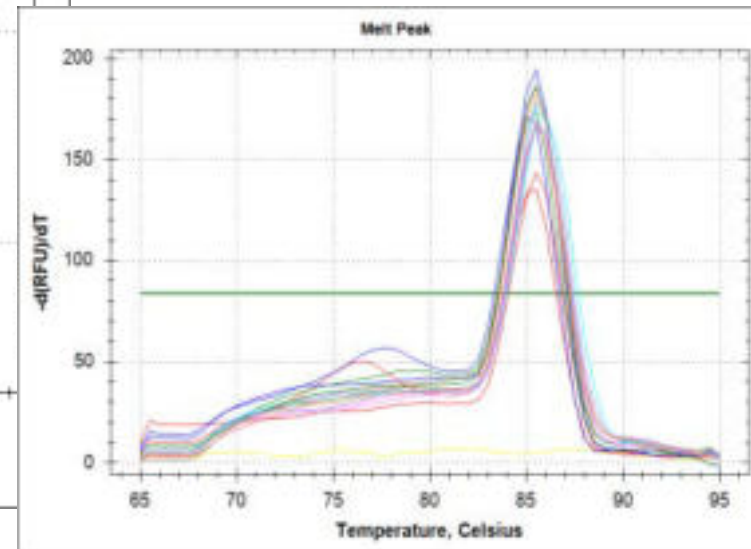
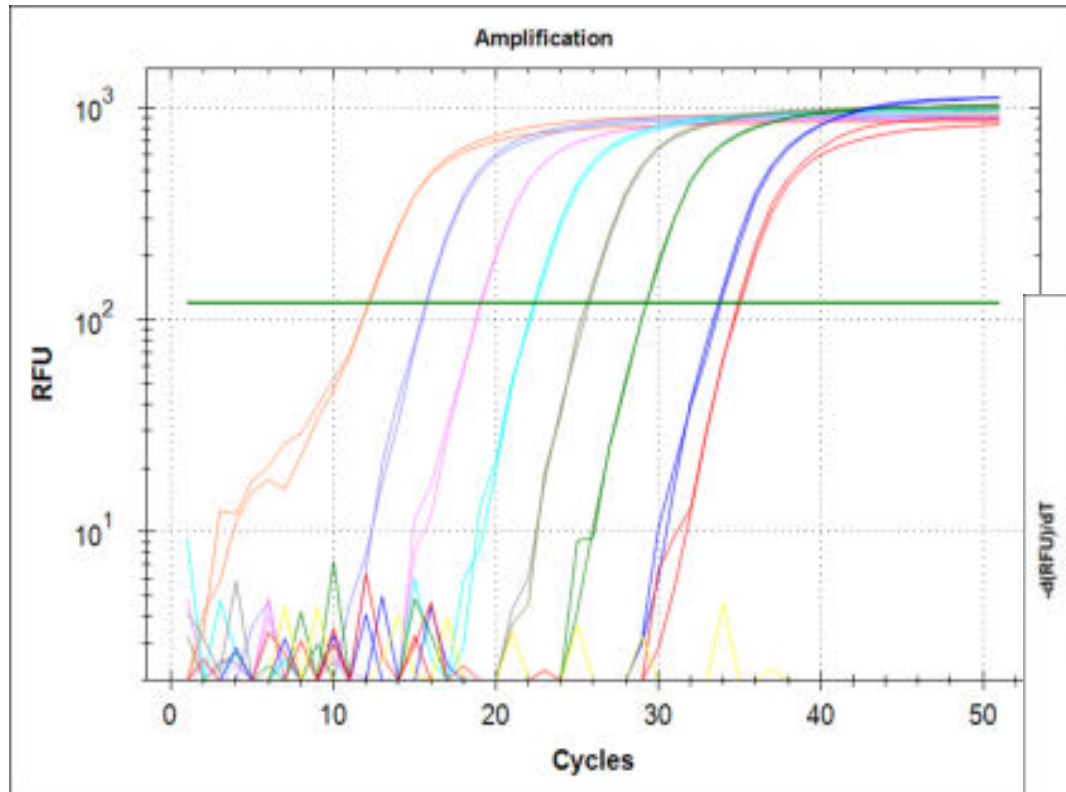
❖ Specificity and sensitivity

- ONLY amplification with *F. sporotrichioides*
- Soil: 10 spores/g



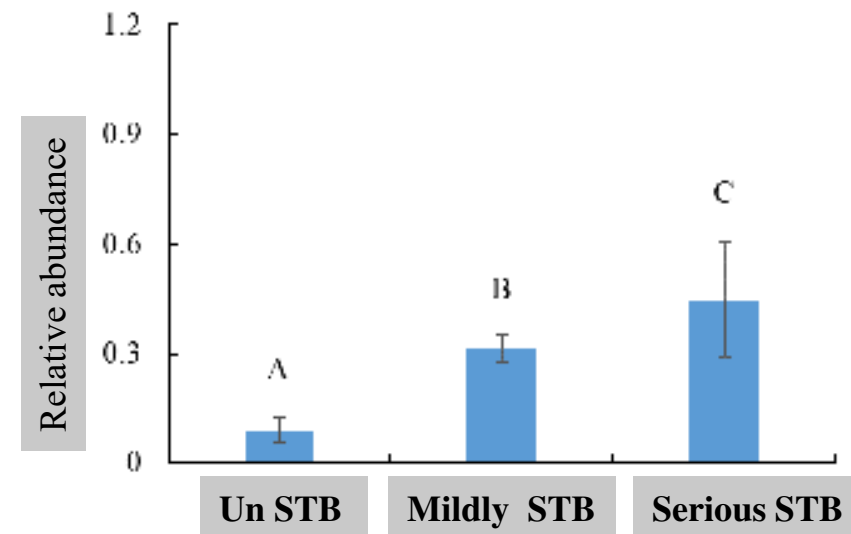
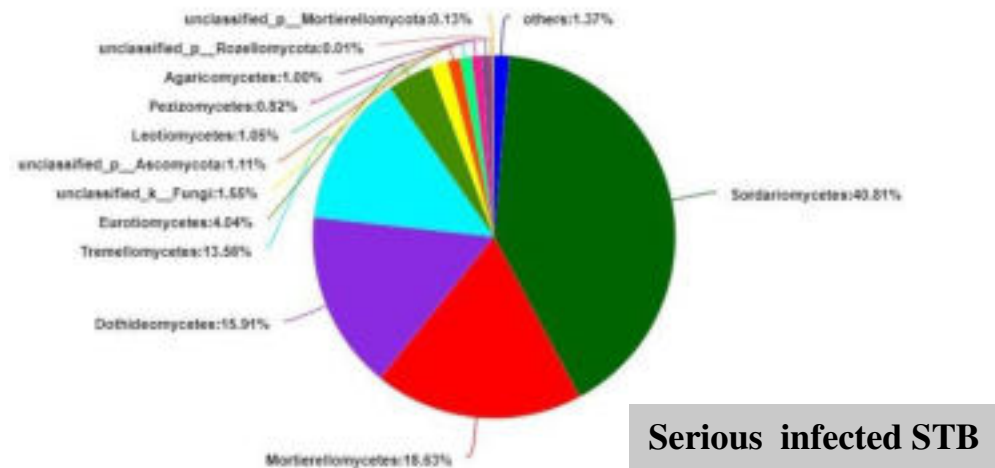
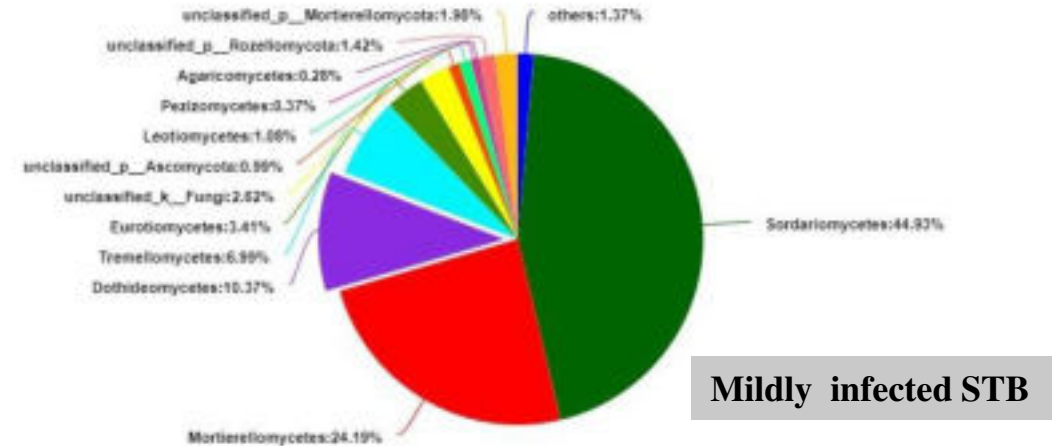
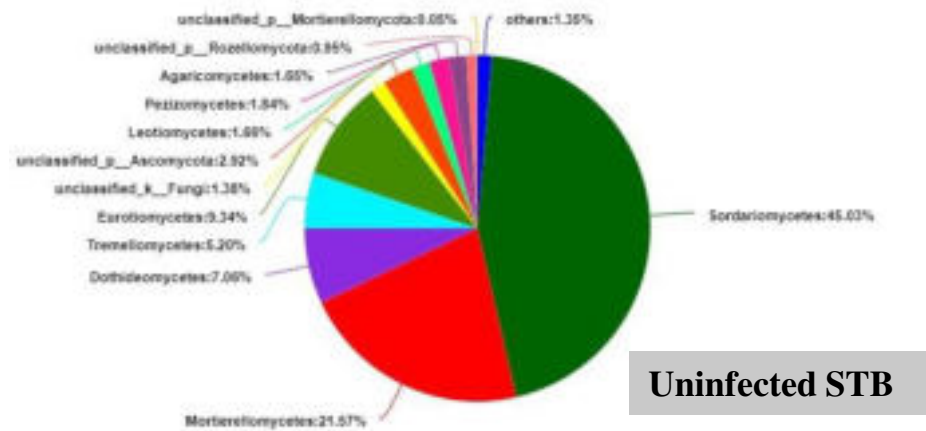
PCR Specific detection

M: DL2000 DNAMarker; Lane 1–11: *F. sporotrichioides*; *Sclerotinia sclerotiorum*; *Colletotrichum sp.*; *Plasmodiophora brassicae*; *Rhizoctonia sp.*; *Fusarium oxysporum*; *Fusarium proliferatum*; *Fusarium equisetum*; *Fusarium tricinctum*; *Gibberella sp.*; *Phomopsis cauliflorum*; 12: ddH₂O

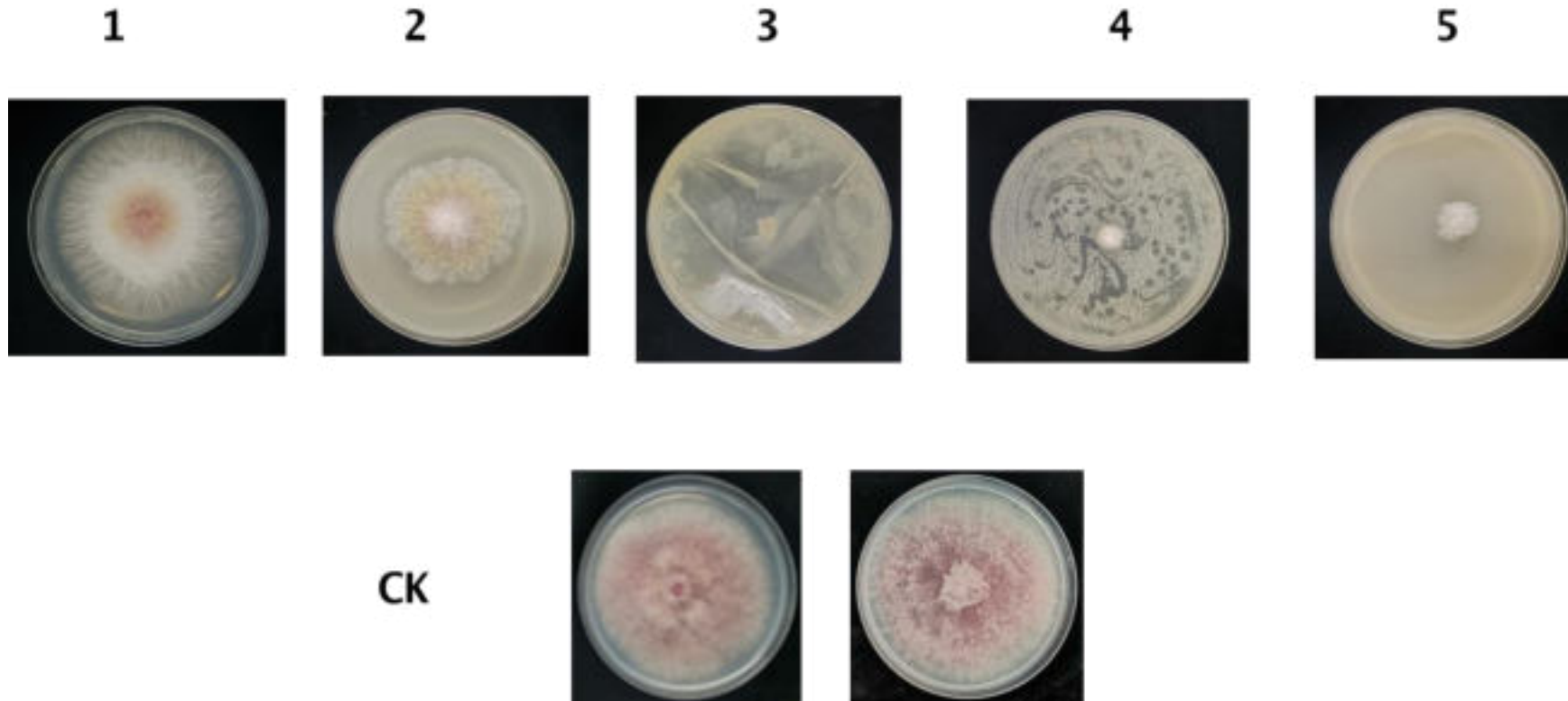


8 of gradient concentrations of resting spores in soil

Characteristics of rhizosphere soil fungal diversity and community structure in SBT fields with different incidence of *Fuarium* Wilt by high-throughput sequencing



Biological agent products screening and application



Biological agent products screening in Laboratory

- Lane 1–5: 5% Zhongsheng、 Live bacteria from sea、 LV kangwei、 Micro-ecological agents 、 105 Billion live bacteria ; CK: *F. sporotrichioides*

Inhibition rate of different biological agent products on *F. sporotrichioides*

Products	Concentration ($\mu\text{L}/\text{mL}$)	Colony diameter (cm)	Inhibition rate (%)
Live bacteria from sea		3.75 ± 0.007 c	56.0 b
105 Billion live bacteria		1.75 ± 0.006 b	82.6 c
5% Zhongsheng	0.001	6.26 ± 0.01 d	21.8 a
LV kangwei		0.62 ± 0.0004 a	97.8 d
Micro-ecological agents		0.53 ± 0.001 a	99.6 d

Control effect >80%

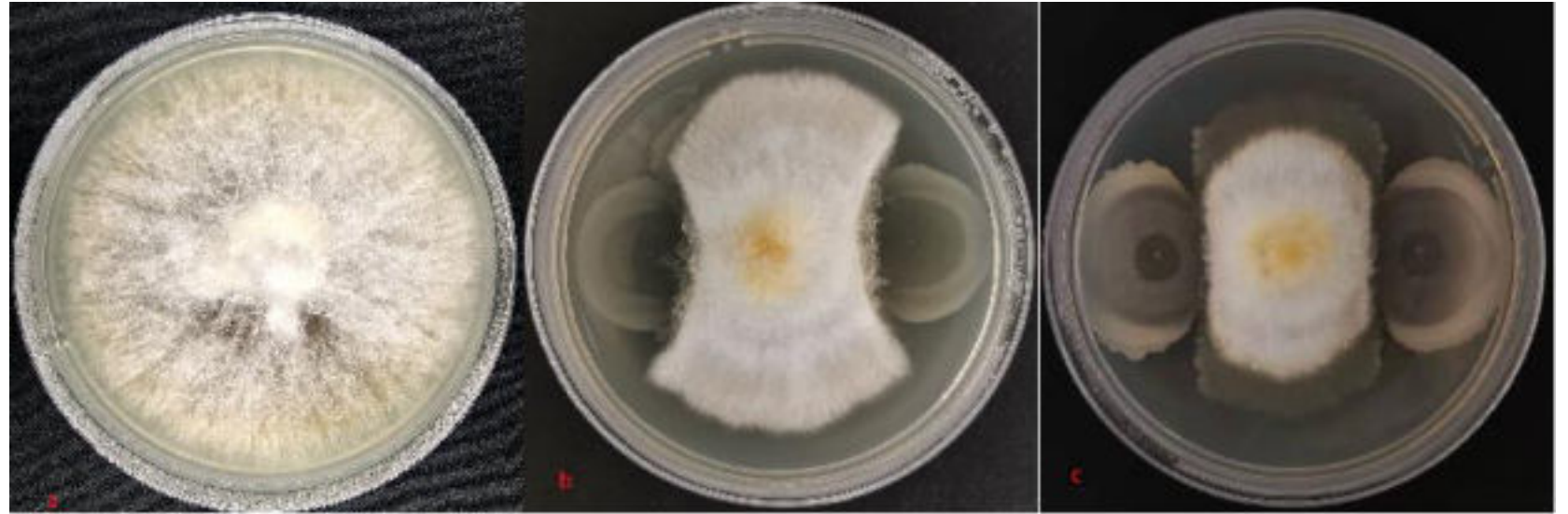
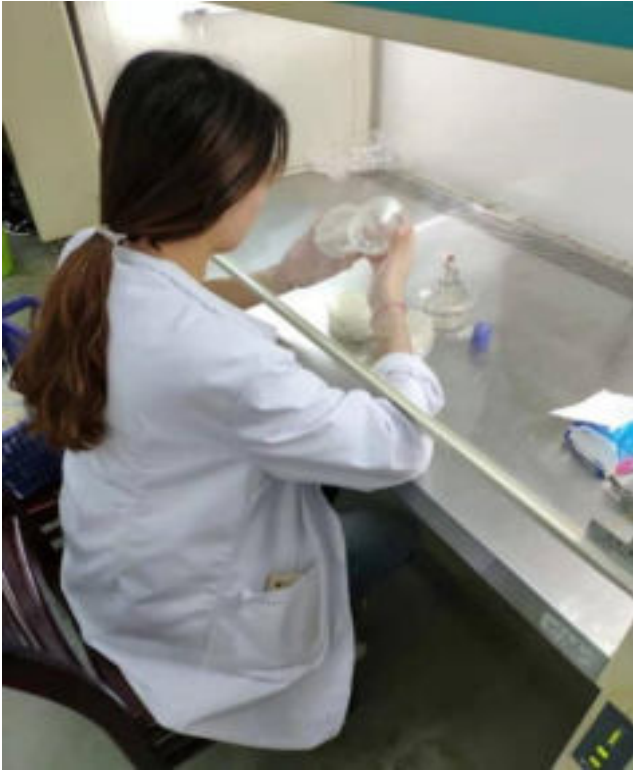


Spray 2-4 times in seedling period



Irrigating root in transplanting period, 2-3 times

Biocontrol strains screening



a: CK, b: GT52-2, c: XJ-7



Thank you!