

***Fusarium* species associated with maize leaf blight in Heilongjiang province, China**

Xi Xu¹, Li Zhang¹, Xilang Yang¹, Guijin Shen¹, Shuo Wang¹, Haolin Teng¹, Chunbo Yang¹, Xueyan Liu¹, Xiangjing Wang^{1,2}, Junwei Zhao^{*}, Wensheng Xiang^{1,2*}

¹ Key Laboratory of Agricultural Microbiology of Heilongjiang Province, Northeast Agricultural University, No. 600 Changjiang Road, Xiangfang District, Harbin 150030, P.R. China

² State Key Laboratory for Biology of Plant Diseases and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing 100097, P.R. China

^{*} Email: xiangwensheng@neau.edu.cn; zhaojunwei@neau.edu.cn

Content:

Supplementary Table S1

Supplementary Table S2

Supplementary Table S3

Table S1. *Tef1* gene sequences similarity to reference strain.

| Species | <i>tef1</i> |
|----------------------------|-------------|
| <i>F. ipomoeae</i> | 98.83-100 |
| <i>F. compactum</i> | 99.22-100 |
| <i>F. flagelliforme</i> | 96.09 |
| <i>F. citri</i> | 99.61 |
| <i>Fusarium</i> sp. | 100 |
| <i>F. armeniacum</i> | 100 |
| <i>F. sporotrichioides</i> | 98.56 |
| <i>F. asiaticum</i> | 100 |
| <i>F. graminearum</i> | 100 |
| <i>F. acuminatum</i> | 100 |
| <i>F. verticillioides</i> | 99.60 |
| <i>F. temperatum</i> | 100 |
| <i>F. glycines</i> | 99.61 |
| <i>F. annulatum</i> | 100 |

Table S2. Disease index and disease incidence on maize leaves inoculated with different *Fusarium* isolates.

| Isolates | Species | Disease index | Disease incidence |
|----------|---------------------|---------------|-------------------|
| HA-z142 | <i>F. ipomoeae</i> | 61.67 | 37.06 |
| HA-z11 | <i>F. ipomoeae</i> | 52.78 | 24.00 |
| HA-z12 | <i>F. ipomoeae</i> | 58.78 | 34.17 |
| HA-z13 | <i>F. ipomoeae</i> | 73.78 | 49.17 |
| HA-z14 | <i>F. ipomoeae</i> | 61.67 | 37.06 |
| HA-z15 | <i>F. ipomoeae</i> | 62.78 | 38.17 |
| HA-z16 | <i>F. ipomoeae</i> | 75.28 | 50.67 |
| HA-z17 | <i>F. ipomoeae</i> | 72.88 | 48.27 |
| HA-z18 | <i>F. ipomoeae</i> | 64.67 | 41.06 |
| HA-z19 | <i>F. ipomoeae</i> | 59.78 | 38.17 |
| HA-z20 | <i>F. ipomoeae</i> | 58.78 | 36.17 |
| HA-z21 | <i>F. ipomoeae</i> | 75.88 | 56.10 |
| HA-z22 | <i>F. ipomoeae</i> | 62.07 | 43.26 |
| HA-x22 | <i>F. ipomoeae</i> | 62.78 | 38.17 |
| HA-xy82 | <i>F. ipomoeae</i> | 62.88 | 38.27 |
| HA-xy83 | <i>F. ipomoeae</i> | 74.68 | 52.07 |
| HA-31 | <i>F. ipomoeae</i> | 63.67 | 39.06 |
| SH-11 | <i>F. ipomoeae</i> | 58.78 | 34.17 |
| SH-63 | <i>F. ipomoeae</i> | 60.78 | 37.17 |
| WC-31 | <i>F. ipomoeae</i> | 77.78 | 62.50 |
| QQ-41 | <i>F. ipomoeae</i> | 61.67 | 38.06 |
| SH-62 | <i>F. ipomoeae</i> | 57.68 | 33.07 |
| HA-z201 | <i>F. ipomoeae</i> | 62.78 | 38.17 |
| HA-21 | <i>F. ipomoeae</i> | 75.78 | 51.17 |
| HA-22 | <i>F. ipomoeae</i> | 61.67 | 37.06 |
| HA-x21 | <i>F. ipomoeae</i> | 59.78 | 35.17 |
| HA-212 | <i>F. ipomoeae</i> | 52.78 | 28.17 |
| DQ-n22 | <i>F. ipomoeae</i> | 71.78 | 47.17 |
| JX-21 | <i>F. ipomoeae</i> | 59.67 | 35.06 |
| DQ-n31 | <i>F. ipomoeae</i> | 62.78 | 38.17 |
| HA-61 | <i>F. compactum</i> | 75.36 | 31.85 |
| HA-111 | <i>F. compactum</i> | 58.12 | 25.10 |
| JX-y11 | <i>F. compactum</i> | 73.62 | 46.29 |
| HA-621 | <i>F. compactum</i> | 58.81 | 32.95 |
| SYS-31 | <i>F. compactum</i> | 54.12 | 46.26 |
| HA-z152 | <i>F. compactum</i> | 73.25 | 38.40 |
| HA-z31 | <i>F. compactum</i> | 59.91 | 41.05 |
| HA-z32 | <i>F. compactum</i> | 73.22 | 47.16 |
| HA-z33 | <i>F. compactum</i> | 65.36 | 46.40 |
| HA-z34 | <i>F. compactum</i> | 68.01 | 38.05 |
| HA-z35 | <i>F. compactum</i> | 74.12 | 47.16 |
| HA-z36 | <i>F. compactum</i> | 73.36 | 38.34 |
| HA-z37 | <i>F. compactum</i> | 65.01 | 36.05 |
| HA-z38 | <i>F. compactum</i> | 74.12 | 41.16 |
| HA-z39 | <i>F. compactum</i> | 65.30 | 48.40 |
| HA-z310 | <i>F. compactum</i> | 63.01 | 34.05 |
| HA-z311 | <i>F. compactum</i> | 68.12 | 47.16 |
| HA-z312 | <i>F. compactum</i> | 75.36 | 46.40 |
| HA-xy151 | <i>F. compactum</i> | 61.01 | 42.95 |
| HA-xy31 | <i>F. compactum</i> | 74.12 | 47.16 |
| HA-a11 | <i>F. compactum</i> | 73.36 | 46.40 |
| HA-42 | <i>F. compactum</i> | 69.91 | 36.05 |
| JX-52 | <i>F. compactum</i> | 74.12 | 31.16 |
| JX-121 | <i>F. compactum</i> | 73.36 | 63.50 |
| JX-31 | <i>F. compactum</i> | 63.01 | 46.66 |
| HA-x12 | <i>F. citri</i> | 55.63 | 24.00 |
| QTH-21 | <i>F. citri</i> | 77.78 | 65.20 |
| HA-z1125 | <i>F. citri</i> | 59.75 | 36.43 |
| HA-z171 | <i>F. citri</i> | 73.95 | 50.63 |
| HA-z172 | <i>F. citri</i> | 65.63 | 41.31 |
| HA-z173 | <i>F. citri</i> | 71.50 | 48.18 |

| Isolates | Species | Disease index | Disease incidence |
|-----------|----------------------------|---------------|-------------------|
| HA-z174 | <i>F. citri</i> | 62.89 | 39.57 |
| HA-z175 | <i>F. citri</i> | 67.78 | 44.46 |
| HA-z176 | <i>F. citri</i> | 57.45 | 34.03 |
| HA-z177 | <i>F. citri</i> | 67.78 | 44.46 |
| HA-z1126 | <i>F. citri</i> | 72.98 | 48.36 |
| HA-xy141 | <i>F. citri</i> | 66.74 | 43.42 |
| HA-z203 | <i>F. citri</i> | 56.14 | 32.82 |
| HA-x11 | <i>F. flagelliforme</i> | 51.85 | 23.03 |
| HA-x51 | <i>F. flagelliforme</i> | 74.78 | 59.50 |
| HA-a31 | <i>F. graminearum</i> | 75.35 | 60.23 |
| HG-11 | <i>F. graminearum</i> | 85.12 | 75.30 |
| QTH-23 | <i>F. graminearum</i> | 76.21 | 57.82 |
| SH-x72 | <i>F. graminearum</i> | 84.67 | 66.28 |
| SYS-y21 | <i>F. graminearum</i> | 75.72 | 57.33 |
| SYS-21 | <i>F. graminearum</i> | 83.63 | 65.24 |
| SYS-141 | <i>F. graminearum</i> | 77.11 | 58.72 |
| SYS-142 | <i>F. graminearum</i> | 82.23 | 63.84 |
| SYS-143 | <i>F. graminearum</i> | 78.314 | 59.92 |
| SYS-144 | <i>F. graminearum</i> | 81.03 | 62.64 |
| SYS-145 | <i>F. graminearum</i> | 79.12 | 60.73 |
| SYS-146 | <i>F. graminearum</i> | 88.04 | 69.65 |
| SYS-147 | <i>F. graminearum</i> | 76.44 | 58.05 |
| HA-a142 | <i>F. graminearum</i> | 80.30 | 61.91 |
| SYS-x71 | <i>F. asiaticum</i> | 60.42 | 42.67 |
| SYS-x91 | <i>F. asiaticum</i> | 74.75 | 57.02 |
| HA-x72 | <i>F. asiaticum</i> | 61.22 | 43.98 |
| HG-x62 | <i>F. asiaticum</i> | 73.95 | 57.71 |
| SYS-x62 | <i>F. asiaticum</i> | 62.72 | 45.48 |
| SYS-x131 | <i>F. asiaticum</i> | 72.45 | 55.21 |
| SYS-x132 | <i>F. asiaticum</i> | 63.82 | 46.58 |
| SYS-x133 | <i>F. asiaticum</i> | 71.25 | 54.01 |
| SYS-x134 | <i>F. asiaticum</i> | 64.62 | 47.38 |
| SYS-x135 | <i>F. asiaticum</i> | 70.65 | 53.41 |
| HA-zh142 | <i>F. temperatum</i> | 60.42 | 52.47 |
| QTH-X332 | <i>F. temperatum</i> | 74.75 | 63.48 |
| QTH-X331 | <i>F. temperatum</i> | 61.22 | 53.19 |
| QTH-X33 | <i>F. temperatum</i> | 73.95 | 62.73 |
| HA-z113 | <i>Fusarium</i> sp. | 70.54 | 63.77 |
| HA-b113 | <i>Fusarium</i> sp. | 77.22 | 74.35 |
| HA-Z1131 | <i>Fusarium</i> sp. | 83.9 | 69.05 |
| SYS-x11 | <i>F. sporotrichioides</i> | 61.11 | 31.25 |
| SYS-x61 | <i>F. sporotrichioides</i> | 59.33 | 30.49 |
| SYS-x1 | <i>F. sporotrichioides</i> | 59.11 | 30.29 |
| SYS-x2 | <i>F. sporotrichioides</i> | 60.78 | 30.98 |
| HG-12 | <i>F. sporotrichioides</i> | 59.66 | 30.67 |
| SYS-33 | <i>F. sporotrichioides</i> | 60.11 | 30.87 |
| SYS-101 | <i>F. sporotrichioides</i> | 60.58 | 30.92 |
| SYS-102 | <i>F. sporotrichioides</i> | 59.33 | 30.49 |
| SYS-103 | <i>F. sporotrichioides</i> | 61.00 | 31.02 |
| SYS-104 | <i>F. sporotrichioides</i> | 61.11 | 31.25 |
| SYS-105 | <i>F. sporotrichioides</i> | 58.35 | 30.15 |
| SYS-51 | <i>F. sporotrichioides</i> | 59.00 | 30.25 |
| HG-y102 | <i>F. sporotrichioides</i> | 58.34 | 30.15 |
| HG-DBY101 | <i>F. sporotrichioides</i> | 58.33 | 30 |
| SH-z61 | <i>F. acuminatum</i> | 62.56 | 44.21 |
| SH-61 | <i>F. acuminatum</i> | 74.72 | 61.11 |
| SH-41 | <i>F. acuminatum</i> | 63.74 | 45.36 |
| HA-a72 | <i>F. acuminatum</i> | 73.54 | 60.56 |
| HA-a161 | <i>F. acuminatum</i> | 64.87 | 46.83 |
| HA-a162 | <i>F. acuminatum</i> | 72.41 | 59.87 |
| HA-a163 | <i>F. acuminatum</i> | 65.93 | 47.32 |
| HA-a164 | <i>F. acuminatum</i> | 71.35 | 58.67 |
| HA-a1211 | <i>F. armeniacum</i> | 61.11 | 32.5 |
| HA-13 | <i>F. armeniacum</i> | 72.22 | 52.5 |

| Isolates | Species | Disease index | Disease incidence |
|----------|---------------------------|---------------|-------------------|
| HA-a121 | <i>F. armeniacum</i> | 61.56 | 32.5 |
| HA-a122 | <i>F. armeniacum</i> | 64.44 | 48.5 |
| HL-42 | <i>F. verticillioides</i> | 62.22 | 33.42 |
| DQ-n32 | <i>F. verticillioides</i> | 73.16 | 53.2 |
| SH-n12 | <i>F. verticillioides</i> | 62.34 | 33.57 |
| JX-123 | <i>F. verticillioides</i> | 68.34 | 50.16 |
| SH-n11 | <i>F. verticillioides</i> | 63.52 | 36.98 |
| SH-n201 | <i>F. verticillioides</i> | 63.78 | 37.23 |
| SH-n202 | <i>F. verticillioides</i> | 63.87 | 37.32 |
| SH-n203 | <i>F. verticillioides</i> | 70.16 | 48.32 |
| SH-n204 | <i>F. verticillioides</i> | 65.22 | 39.62 |
| SH-n205 | <i>F. verticillioides</i> | 63.16 | 35.87 |
| JX-3352 | <i>F. glycines</i> | 67.78 | 45.05 |
| JX-335 | <i>F. glycines</i> | 68.87 | 45.19 |
| HA-171 | <i>F. glycines</i> | 71.32 | 45.83 |
| HA-172 | <i>F. glycines</i> | 72.11 | 46 |
| HA-173 | <i>F. glycines</i> | 61.11 | 44 |
| HA-174 | <i>F. glycines</i> | 70.35 | 45.62 |
| WC-b53 | <i>F. glycines</i> | 65.83 | 44.49 |
| HA-z1412 | <i>F. glycines</i> | 64.90 | 44.22 |
| WC-22 | <i>F. annulatum</i> | 63.93 | 40.50 |

Table S3. DNA polymorphism data for FIESC isolates based on *tef1* gene sequences.

| Polymorphism parameter | <i>tef1</i> |
|----------------------------------------------------|------------------------|
| Number of isolates | 70 |
| Analyzed region | 1-263 |
| Number of haplotypes, H | 7 |
| Number of polymorphic sites, S | 28 |
| Number of mutations, Eta | 28 |
| Singleton variable sites | 0 |
| Haplotype diversity, <i>h</i> | 0.759 |
| Nucleotide diversity, π | 0.02396 |
| Average number of nucleotide differences, <i>k</i> | 5.966 |
| Tajima's D | 0.08450 ($p > 0.10$) |
| Fu and Li's D | 1.86276 ($p < 0.02$) |
| Fu and Li's F | 1.43557 ($p > 0.10$) |