

**Table S1.** Kernel resistance tests of maize hybrids to toxigenic fungi. ANOVA of the ear rot data of maize resistance test to toxigenic fungi (2017–2018).

| Source of variance | SS       | df  | MS       | F         |
|--------------------|----------|-----|----------|-----------|
| Hybrid A           | 1381.31  | 17  | 81.25    | 3.50**    |
| Tox. spp. B        | 34725.54 | 3   | 11575.18 | 498.93*** |
| Isolate C          | 603.00   | 1   | 603.00   | 25.99***  |
| Year D             | 3749.36  | 1   | 3749.36  | 161.61*** |
| A × B              | 3716.68  | 51  | 72.88    | 3.14***   |
| A × C              | 577.27   | 17  | 33.96    | 1.46      |
| A × D              | 968.62   | 17  | 56.98    | 2.46      |
| B × C              | 1847.21  | 3   | 615.74   | 26.54***  |
| B × D              | 11770.75 | 3   | 3923.58  | 169.12*** |
| C × D              | 388.63   | 1   | 388.63   | 16.75***  |
| A × B × C          | 1752.40  | 51  | 34.36    | 1.48*     |
| A × B × D          | 2878.55  | 51  | 56.44    | 2.43***   |
| A × C × D          | 319.94   | 17  | 18.82    | 0.81ns    |
| B × C × D          | 1048.26  | 3   | 349.42   | 15.06***  |
| A × B × C × D      | 989.37   | 51  | 19.40    | 0.84ns    |
| Within             | 13387.95 | 576 | 23.24    |           |
| Total              | 80104.82 | 863 |          |           |

\*\*\* P = 0.001, \*\* P = 0.01, \* P = 0.05, ns = not significant

**Table S2.** Kernel resistance test of maize hybrids to toxigenic fungi. Mycotoxin contamination of maize ears following *F. graminearum*, *F. verticillioides*, and *A. flavus* inoculation in maize hybrids with two isolates per year, 2017–2018.

| Hybrid        | DON mg/kg |        |        |       | Variance | Fumonisin B <sub>1</sub> +B <sub>2</sub> , mg/kg |        |        |        |      | Variance | Aflatoxin B1 |        |        |        |      | Variance |
|---------------|-----------|--------|--------|-------|----------|--|--------|--------|--------|------|----------|--------------|--------|--------|--------|------|----------|
|               | Fg3 17    | Fg3 18 | Fg4 18 | Mean  |          | Fv1 17   | Fv2 17 | Fv1 18 | Fv2 18 | Mean |          | Af2 17       | Af1 17 | AF2 18 | AF1 18 | Mean |          |
| P 9537        | 7.3       | 6.4    | 8.1    | 7.27  | 14       | 7.0  | 3.6    | 1.4    | 0.3    | 3.1  | 8.7      | 48           | 30     | 5      | 4      | 22   | 451      |
| DKC 4590      | 4.6       | 2.3    | 19.4   | 8.75  | 76       | 5.3  | 2.2    | 0.9    | 0.9    | 2.3  | 4.4      | 36           | 18     | 17     | 15     | 22   | 95       |
| Fornad        | 15.7      | 3.2    | 13.6   | 10.84 | 58       | 7.2  | 10.1   | 0.0    | 0.6    | 4.5  | 24.5     | 145          | 162    | 81     | 161    | 137  | 1467     |
| 4517          | 15.4      | 11.4   | 7.9    | 11.58 | 37       | 15.1   | 21.9   | 2.3    | 6.6    | 11.4 | 76.6     | 119          | 144    | 31     | 17     | 78   | 3989     |
| DKC 4717      | 13.4      | 15.4   | 12.7   | 13.81 | 48       | 2.2  | 2.0    | 0.3    | 0.0    | 1.1  | 1.2      | 41           | 58     | 38     | 24     | 40   | 195      |
| DKC 4943      | 14.7      | 7.0    | 20.2   | 13.98 | 76       | 1.4  | 1.9    | 0.3    | 0.1    | 0.9  | 0.7      | 14           | 65     | 73     | 25     | 44   | 848      |
| Szegedi 521   | 16.1      | 17.8   | 10.5   | 14.80 | 51       | 2.9  | 2.7    | 3.7    | 1.6    | 2.7  | 0.8      | 516          | 334    | 45     | 264    | 290  | 37904    |
| P 9903        | 3.9       | 25.0   | 22.2   | 17.04 | 104      | 2.0  | 3.2    | 1.3    | 0.2    | 1.7  | 1.5      | 63           | 14     | 64     | 13     | 39   | 834      |
| Cardixxio Duo | 8.8       | 29.8   | 13.4   | 17.32 | 157      | 1.3  | 3.0    | 0.5    | 0.1    | 1.2  | 1.6      | 28           | 69     | 20     | 1      | 30   | 822      |
| PR37F80       | 25.2      | 11.6   | 18.9   | 18.57 | 116      | 18.7   | 9.1    | 2.4    | 0.5    | 7.7  | 67.5     | 89           | 84     | 40     | 328    | 135  | 16997    |
| DKC 4541      | 6.3       | 18.4   | 31.9   | 18.85 | 197      | 4.5  | 5.7    | 1.4    | 1.0    | 3.2  | 5.3      | 64           | 118    | 14     | 34     | 58   | 2049     |
| DKC 5542      | 16.3      | 9.6    | 32.6   | 19.54 | 189      | 2.2  | 1.6    | 0.5    | 0.9    | 1.3  | 0.6      | 333          | 697    | 321    | 3      | 339  | 80473    |
| P 9241        | 6.0       | 25.9   | 26.7   | 19.57 | 187      | 3.2  | 1.6    | 1.2    | 1.2    | 1.8  | 0.8      | 21           | 12     | 9      | 37     | 20   | 158      |
| P 9911        | 21.9      | 14.0   | 23.5   | 19.79 | 115      | 7.8  | 3.2    | 6.2    | 8.7    | 6.5  | 5.7      | 102          | 102    | 31     | 2      | 59   | 2577     |
| DKC 5830      | 14.3      | 36.9   | 17.0   | 22.72 | 231      | 1.0  | 2.0    | 0.6    | 0.3    | 1.0  | 0.6      | 847          | 77     | 356    | 8      | 322  | 145134   |
| Siló Star     | 23.0      | 16.6   | 30.9   | 23.47 | 172      | 2.4  | 0.6    | 0.9    | 0.3    | 1.1  | 0.9      | 350          | 81     | 64     | 314    | 202  | 22711    |
| Korimbos      | 20.7      | 16.9   | 39.8   | 25.79 | 266      | 1.0  | 0.9    | 0.6    | 0.7    | 0.8  | 0.0      | 345          | 779    | 70     | 1      | 299  | 124587   |
| Valkür        | 99.5      | 43.5   | 46.8   | 63.28 | 1659     | 2.8  | 1.1    | 2.3    | 0.3    | 1.6  | 1.3      | 15           | 16     | 0      | 21     | 13   | 82       |
| Mean          | 18.5      | 17.3   | 22.0   | 19.28 | 208      | 4.9  | 4.2    | 1.5    | 1.3    | 3.0  | 11.3     | 176          | 159    | 71     | 71     | 119  | 24521    |
| LSD 5%        |           |        |        | 21.5  |          |  |        |        |        | 4.0  |          |              |        |        |        |      | 66       |

| Correlations | Fg3     | Fg3     | Fg4     | Mean | Corr. | Fv1 17 | Fv2 17  | Fv1 18  | Fv2 18  | Corr.   | Af2 17 | Af1 17  | AF2 18  | AF1 18  |      |
|--------------|---------|---------|---------|------|-------|--------|---------|---------|---------|---------|--------|---------|---------|---------|------|
|              |         |         |         |      |       | Fv2 17 | 0.77*** |         |         |         | Af1 17 | 0.40    |         |         |      |
| Fg3          | 0.51*   |         |         |      |       | Fv1 18 | 0.37    | 0.13    |         |         | AF2 18 | 0.74*** | 0.41    |         |      |
| Fg4          | 0.58*   | 0.40    |         |      |       | Fv2 18 | 0.44    | 0.49*   | 0.77*** |         | AF1 18 | 0.21    | -0.05   | -0.12   |      |
| Mean         | 0.91*** | 0.74*** | 0.77*** |      |       | Mean   | 0.91*** | 0.89*** | 0.51*   | 0.71*** | Átlag  | 0.88*** | 0.74*** | 0.74*** | 0.29 |

\*\*\* P=0.001, \*P = 0.05 Fg = *F. graminearum*, Fv = *F. verticillioides*, Af = *A. flavus*

**Table S3.** Kernel resistance test of maize hybrids. Correlations counted from the data from the 2017–2018 maize ear rot resistance tests are from Table 4.

| Trait                           | Toxigenic spp., ear rot % |          |        | Toxins    |                                       |                        | Control      |             |           |                                       |                        |
|---------------------------------|---------------------------|----------|--------|-----------|---------------------------------------|------------------------|--------------|-------------|-----------|---------------------------------------|------------------------|
|                                 | Fg                        | Fv       | Af     | DON mg/kg | FB <sub>1</sub> +B <sub>2</sub> mg/kg | AFB <sub>1</sub> µg/kg | F. Ear rot % | Af ear rot% | DON mg/kg | FB <sub>1</sub> +B <sub>2</sub> mg/kg | AFB <sub>1</sub> µg/kg |
| Fg                              |                           |          |        |           |                                       |                        |              |             |           |                                       |                        |
| Fv                              | 0.319                     |          |        |           |                                       |                        |              |             |           |                                       |                        |
| Af                              | 0.512*                    | 0.575*   |        |           |                                       |                        |              |             |           |                                       |                        |
| DON                             | 0.419                     | -0.331   | -0.359 |           |                                       |                        |              |             |           |                                       |                        |
| FB <sub>1</sub> +B <sub>2</sub> | 0.209                     | 0.59***  | 0.178  | -0.226    |                                       |                        |              |             |           |                                       |                        |
| AFB <sub>1</sub>                | -0.172                    | -0.171   | -0.137 | 0.014     | -0.168                                |                        |              |             |           |                                       |                        |
| F. Ear rot                      | 0.123                     | 0.827*** | 0.491* | -0.575*** | 0.637**                               | -0.141                 |              |             |           |                                       |                        |
| Afl ear rot                     | 0.152                     | 0.236    | 0.070  | -0.165    | 0.271                                 | -0.201                 | 0.428        |             |           |                                       |                        |
| DON                             | -0.261                    | -0.185   | -0.296 | 0.259     | -0.271                                | 0.351                  | -0.372       | -0.046      |           |                                       |                        |
| FB <sub>1</sub> +B <sub>2</sub> | -0.191                    | 0.418    | -0.141 | -0.312    | 0.715***                              | -0.117                 | 0.486*       | 0.047       | -0.259    |                                       |                        |
| AFB <sub>1</sub>                | -0.520*                   | -0.162   | -0.229 | -0.129    | 0.052                                 | 0.509*                 | 0.010        | -0.205      | 0.100     | 0.098                                 |                        |
| FAO No.                         | -0.071                    | 0.366    | 0.453  | -0.753*** | 0.062                                 | -0.478*                | 0.505*       | 0.232       | -0.342    | 0.043                                 | -0.267                 |

\*\*\* P = 0.001; \*\* P = 0.01; \* P = 0.05; xFg = *F. graminearum*; Fv = *F. verticillioides*; Af = *A. flavus*.

**Table S4.** Kernel resistance tests of maize hybrids to toxigenic fungi. Reductions in the ear rot severity and toxin contamination are compared to the most susceptible hybrid in the given column. Data are shown as percentages (Szeged, 2017–2018).

| Hybrid        | Toxic spp., ear rot % |      |      | Toxins       |                 |               | Control         |                  |              |                 |               | Mean | FAO No. |
|---------------|-----------------------|------|------|--------------|-----------------|---------------|-----------------|------------------|--------------|-----------------|---------------|------|---------|
|               | Fg*                   | Fv   | Af   | DON<br>mg/kg | FB1+B2<br>mg/kg | AFB1<br>µg/kg | F. Ear<br>rot % | Afl ear<br>rot % | DON<br>mg/kg | FB1+B2<br>mg/kg | AFB1<br>µg/kg |      |         |
| Szegedi 521   | 53.4                  | 78.8 | 79.1 | 69.1         | 76.4            | 94.2          | 66.6            | 100.0            | 100.0        | 89.9            | 84.5          | 82.3 | 350     |
| Korimbos      | 55.6                  | 72.6 | 69.8 | 88.5         | 79.9            | 93.6          | 63.3            | 100.0            | 100.0        | 78.3            | 87.8          | 79.9 | 370     |
| DKC 4590      | 47.0                  | 80.8 | 39.3 | 72.6         | 92.9            | 91.3          | 61.9            | 100.0            | 92.5         | 97.4            | 97.2          | 79.8 | 470     |
| P9537         | 41.7                  | 73.3 | 56.8 | 73.1         | 73.3            | 88.6          | 36.1            | 100.0            | 95.8         | 94.2            | 97.2          | 76.9 | 390     |
| 4517          | 57.3                  | 69.2 | 68.6 | 86.2         | 90.3            | 93.6          | 26.3            | 70.6             | 92.1         | 60.9            | 98.2          | 73.9 | 360     |
| P9241         | 49.3                  | 61.6 | 49.3 | 78.5         | 84.4            | 88.1          | 49.5            | 100.0            | 97.9         | 72.8            | 67.4          | 72.3 | 390     |
| DKC 4717      | 67.6                  | 96.8 | 89.8 | 59.2         | 89.3            | 11.7          | 82.7            | 100.0            | 0.0          | 94.0            | 69.6          | 70.0 | 575     |
| Cardixxio Duo | 22.2                  | 76.9 | 37.9 | 64.1         | 88.8            | 4.9           | 69.6            | 100.0            | 100.0        | 98.7            | 97.2          | 69.9 | 560     |
| DKC 5542      | 16.7                  | 87.8 | 94.2 | 0.0          | 0.0             | 96.2          | 96.1            | 100.0            | 74.6         | 92.8            | 94.5          | 68.4 | 730     |
| Fornad        | 42.6                  | 77.7 | 66.8 | 62.9         | 90.8            | 40.3          | 70.2            | 100.0            | 45.8         | 95.6            | 57.0          | 68.2 | 490     |
| Siló Star     | 41.9                  | 73.0 | 17.0 | 77.9         | 61.0            | 86.9          | 53.2            | 70.6             | 86.7         | 93.9            | 76.2          | 66.5 | 400     |
| DKC 4943      | 46.4                  | 73.1 | 79.3 | 69.1         | 91.8            | 0.0           | 45.9            | 100.0            | 100.0        | 61.6            | 63.5          | 66.4 | 540     |
| P9903         | 79.0                  | 83.1 | 76.0 | 76.6         | 85.3            | 14.4          | 38.5            | 94.1             | 93.8         | 90.8            | 0.0           | 65.8 | 560     |
| P9911         | 26.8                  | 74.5 | 72.8 | 68.7         | 43.5            | 82.5          | 28.0            | 0.0              | 100.0        | 77.3            | 88.4          | 59.8 | 450     |
| DKC 4541      | 24.5                  | 5.3  | 25.4 | 70.2         | 72.2            | 83.0          | 0.0             | 76.5             | 97.9         | 81.6            | 90.6          | 58.0 | 370     |
| DKC 5830      | 0.0                   | 27.5 | 0.0  | 70.7         | 85.7            | 60.0          | 14.9            | 100.0            | 100.0        | 87.1            | 79.0          | 55.8 | 420     |
| Valkür        | 53.9                  | 26.0 | 65.3 | 81.7         | 33.1            | 77.0          | 12.2            | 100.0            | 100.0        | 0.0             | 64.6          | 54.7 | 520     |
| PR37F80       | 45.3                  | 0.0  | 39.6 | 82.9         | 91.5            | 59.5          | 8.0             | 47.1             | 56.3         | 78.0            | 92.8          | 53.4 | 420     |
| Mean          | 45.4                  | 67.0 | 60.4 | 73.6         | 78.2            | 68.6          | 48.4            | 91.7             | 90.2         | 85.0            | 82.7          | 67.9 |         |

\*Fg = *F. graminearum*; Fv = *F. verticillioides*; Af = *A. flavus*; DON = deoxynivalenol; FB<sub>1</sub>+B<sub>2</sub> = fumonisin B<sub>1</sub>+B<sub>2</sub>; AFB<sub>1</sub> = aflatoxin B<sub>1</sub>; F. Control = natural fusarium infection in the check; Asp. Check = *A. flavus* natural infection in their control; FAO No. = earliness or lateness of the hybrids according to the FAO international methodology.

**Table S5.** Kernel resistance of maize hybrids to toxigenic fungi, ANOVA of the ear rot data from Table 5, 2019–2020.

| Source of var. | SS       | df  | MQ       | F         | LSD 5% |
|----------------|----------|-----|----------|-----------|--------|
| Genotype A     | 3403.7   | 17  | 200.22   | 6.89***   | 2.16   |
| Tox. spp. B    | 74832.8  | 3   | 24944.26 | 858.96*** | 1.02   |
| Isolate C      | 38.3     | 1   | 38.32    | 1.32      |        |
| Year D         | 6143.3   | 1   | 6143.26  | 211.54*** | 0.72   |
| A × B          | 10170.7  | 51  | 199.43   | 6.86***   |        |
| A × C          | 426.5    | 17  | 25.09    | 0.86      |        |
| A × D          | 2081.5   | 17  | 122.44   | 4.21***   |        |
| B × C          | 80.1     | 3   | 26.68    | 0.92      |        |
| B × D          | 18478.6  | 3   | 6159.54  | 212.10*** |        |
| C × D          | 29.2     | 1   | 29.18    | 1.00      |        |
| A × B × C      | 1283.9   | 51  | 25.17    | 0.87      |        |
| A × B × D      | 6310.4   | 51  | 123.73   | 4.26***   |        |
| A × C × D      | 531.2    | 17  | 31.25    | 1.08      |        |
| B × C × D      | 101.0    | 3   | 33.65    | 1.16      |        |
| A × B × C × D  | 1651.3   | 51  | 32.38    | 1.11      |        |
| Within         | 16729.8  | 576 | 29.04    |           |        |
| Total          | 142292.1 | 863 |          |           |        |

\*\*\* P = 0.001.

**Table S6.** Kernel resistance of maize hybrids to toxigenic fungi. Mycotoxin contamination of maize ears following *F. graminearum*, *F. verticillioides*, and *A. flavus* inoculation with two isolates per year, 2019–2020.

| Hybrid       | DON mg/kg |        |        |        |       | Variance | Fumonisin B <sub>1</sub> +B <sub>2</sub> , mg/kg |        |        |        |        | Variance | Aflatoxin B <sub>1</sub> µg/kg |        |       |       |         | Variance |
|--------------|-----------|--------|--------|--------|-------|----------|--|--------|--------|--------|--------|----------|--------------------------------|--------|-------|-------|---------|----------|
|              | Fg3 19    | Fg4 19 | Fg3 20 | Fg4 20 | Mean  |          | Fv1 19   | Fv2 19 | Fv1 20 | Fv2 20 | Mean   |          | Af 19                          | Af2 19 | Afl1  | Afl2  | Mean    |          |
| Sy Talisman  | 3.9       | 9.6    | 6.1    | 10.3   | 7.5   | 9        | 1.0  | 0.8    | 4.9    | 0.5    | 1.8    | 4.2      | 135                            | 13     | 42    | 92    | 71      | 2914     |
| Kathedralis  | 15.4      | 23.7   | 0.0    | 14.5   | 13.4  | 97       | 0.5  | 1.5    | 10.3   | 2.7    | 3.8    | 20.0     | 40                             | 32     | 805   | 567   | 361     | 150285   |
| Konfites     | 25.2      | 21.0   | 4.6    | 21.8   | 18.1  | 85       | 1.0  | 0.6    | 12.0   | 0.3    | 3.5    | 32.6     | 43                             | 41     | 69    | 59    | 53      | 179      |
| Armagnac     | 18.1      | 45.6   | 7.2    | 30.2   | 25.3  | 272      | 1.0  | 0.0    | 0.3    | 2.2    | 0.9    | 0.9      | 150                            | 58     | 148   | 35    | 98      | 3591     |
| P9718E       | 41.6      | 49.6   | 11.6   | 10.6   | 28.4  | 408      | 1.9  | 1.2    | 3.3    | 0.7    | 1.8    | 1.4      | 108                            | 356    | 21    | 155   | 160     | 20155    |
| P0725        | 3.3       | 41.7   | 44.0   | 25.3   | 28.6  | 354      | 3.9  | 0.0    | 7.3    | 5.8    | 4.1    | 10.1     | 1                              | 1      | 1354  | 1096  | 613     | 510486   |
| Koregraf     | 54.5      | 0.3    | 22.5   | 45.6   | 30.7  | 594      | 1.4  | 1.2    | 6.4    | 0.9    | 2.5    | 6.9      | 40                             | 42     | 59    | 6     | 37      | 493      |
| ES Harmonium | 116.6     | 26.2   | 3.4    | 4.2    | 37.6  | 2885     | 1.4  | 2.3    | 4.0    | 0.7    | 2.1    | 2.1      | 162                            | 33     | 28    | 25    | 62      | 4455     |
| ES Lagoon    | 17.1      | 29.6   | 3.4    | 105.3  | 38.9  | 2076     | 0.8  | 3.2    | 6.3    | 2.2    | 3.1    | 5.5      | 143                            | 16     | 3261  | 164   | 896     | 2490153  |
| Illango      | 15.1      | 67.6   | 104.7  | 0.7    | 47.0  | 2306     | 0.9  | 5.2    | 2.8    | 1.6    | 2.6    | 3.5      | 56                             | 85     | 56    | 4076  | 1068    | 4020880  |
| DKC 5830     | 50.7      | 111.4  | 24.2   | 8.8    | 48.8  | 2044     | 0.9  | 5.2    | 4.6    | 2.3    | 3.3    | 4.0      | 56                             | 85     | 56    | 784   | 245     | 129188   |
| DKC 4541     | 13.2      | 149.5  | 24.0   | 9.9    | 49.1  | 4509     | 2.9  | 3.2    | 8.3    | 1.6    | 4.0    | 8.9      | 465                            | 134    | 79    | 19    | 174     | 39777    |
| P9415        | 38.1      | 129.4  | 17.5   | 86.9   | 68.0  | 1301     | 0.5  | 0.9    | 3.6    | 0.6    | 1.4    | 2.2      | 50                             | 83     | 6     | 11    | 38      | 1307     |
| Kleopatras   | 154.9     | 74.3   | 6.2    | 61.5   | 74.2  | 3768     | 0.9  | 2.3    | 2.1    | 2.0    | 1.8    | 0.4      | 1                              | 12     | 37    | 1190  | 310     | 344405   |
| Korimbos     | 55.9      | 49.9   | 48.5   | 150.0  | 76.1  | 2439     | 0.8  | 0.3    | 16.1   | 5.4    | 5.7    | 54.1     | 11                             | 47     | 6     | 111   | 44      | 2344     |
| Valkür       | 87.1      | 62.1   | 24.3   | 157.0  | 82.6  | 3125     | 1.6  | 0.5    | 2.1    | 2.0    | 1.6    | 0.5      | 0                              | 20     | 487   | 314   | 205     | 55885    |
| Sy Zoan      | 120.7     | 90.8   | 168.2  | 5.7    | 96.3  | 4665     | 2.6  | 1.2    | 7.5    | 15.3   | 6.7    | 40.6     | 2                              | 15     | 69    | 4947  | 1258    | 6048342  |
| SY Zephir    | 184.4     | 193.7  | 20.6   | 5.4    | 101.0 | 10388    | 2.7  | 0.8    | 2.1    | 0.6    | 1.5    | 1.0      | 149                            | 6      | 2377  | 20    | 638     | 1348197  |
| Mean         | 56.4      | 65.3   | 30.0   | 41.9   | 48.4  | 2364     | 1.5  | 1.7    | 5.8    | 2.6    | 2.9    | 11.0     | 90                             | 60     | 498   | 760   | 352     | 842946   |
| LSD 5%       | ns        |        |        |        |       |          | ns   |        |        |        |        |          | ns                             |        |       |       |         |          |
| Correlation  | Fg3       | Fg4    | Fg3    | Fg4    |       |          | Corr.  | Fv1 19 | Fv2 19 | Fv1 20 | Fv2 20 |          | Corr.                          | Afl1   | Afl2  | Afl1  | Afl2    | Mean     |
| Fg4          | 0.44      |        |        |        |       |          | Fv2 19   | -0.22  |        |        |        |          | Afl2                           | 0.27   |       |       |         |          |
| Fg3          | 0.15      | 0.19   |        |        |       |          | Fv1 20   | -0.08  | 0.04   |        |        |          | Afl1                           | 0.08   | -0.30 |       |         |          |
| Fg4          | 0.03      | -0.11  | -0.14  |        |       |          | Fv2 20   | -0.02  | 0.05   | 0.26   |        |          | Afl2                           | -0.31  | -0.11 | -0.15 |         |          |
| Mean         | 0.75***   | 0.69** | 0.47   | 0.35   |       |          | Mean   | 0.34   | 0.43   | 0.61*  | 0.64*  |          | Mean                           | -0.16  | -0.21 | 0.45  | 0.81*** |          |

\*\*\*\* P = 0.001, \* P = 0.05. **Bold numbers:** low toxin contamination and stable toxin performance in the three toxins measured. **Bold hybrid name:** low toxin contamination and variance (high stability) We have Talisman with mean 71, and variance 2914.

**Table S7.** Kernel resistance tests of maize hybrids to toxigenic fungi. Correlation coefficients between traits in Table 6 (Szeged, 2019–2020).

| Correlations from<br>Table 10   | Fg     | Fv       | Af     | DON     | FB <sub>1</sub> +B <sub>2</sub> | AFB1    | F. check. | Af. check. | DON    | FB <sub>1</sub> +B <sub>2</sub> | AFB1  |
|---------------------------------|--------|----------|--------|---------|---------------------------------|---------|-----------|------------|--------|---------------------------------|-------|
| Fv                              | 0.110  |          |        |         |                                 |         |           |            |        |                                 |       |
| Af                              | -0.161 | 0.743*** |        |         |                                 |         |           |            |        |                                 |       |
| DON                             | 0.482* | -0.112   | -0.364 |         |                                 |         |           |            |        |                                 |       |
| FB <sub>1</sub> +B <sub>2</sub> | -0.055 | 0.202    | 0.154  | 0.225   |                                 |         |           |            |        |                                 |       |
| AFB1                            | 0.273  | 0.005    | 0.000  | 0.389   | 0.410                           |         |           |            |        |                                 |       |
| F. check.                       | -0.091 | 0.619**  | 0.539* | -0.496* | 0.059                           | -0.052  |           |            |        |                                 |       |
| Af. check.                      | 0.282  | 0.190    | -0.021 | 0.049   | 0.320                           | 0.706** | 0.143     |            |        |                                 |       |
| DON                             | -0.185 | 0.319    | 0.178  | 0.033   | 0.201                           | -0.475* | 0.006     | -0.113     |        |                                 |       |
| FB <sub>1</sub> +B <sub>2</sub> | 0.249  | 0.396    | 0.475* | 0.005   | -0.006                          | -0.052  | 0.268     | -0.023     | 0.314  |                                 |       |
| AFB1                            | -0.227 | -0.074   | -0.077 | -0.044  | 0.179                           | 0.375   | -0.175    | 0.408      | -0.185 | -0.437                          |       |
| FAO                             | 0.269  | -0.342   | -0.367 | 0.482*  | 0.258                           | 0.286   | -0.601*   | 0.101      | 0.077  | 0.022                           | 0.254 |

\*\*\* P = 0.001; \*\* P = 0.01; \* P = 0.05. xFg = *F. graminearum*; Fv = *F. verticillioides*; Af = *A. flavus*.

**Table S8.** Kernel resistance tests of maize hybrids to toxigenic fungi. Reductions in the disease severity and toxin contamination compared to the most susceptible hybrid in the given column in Table 5 (Szeged, 2019–2020).

| Hybrid       | Ear Rot Severity % |      |       | Toxin Content |              |          | Ear Rot Check |           | Toxin Content Control |              |            | Mean | Variance | FAO No. |
|--------------|--------------------|------|-------|---------------|--------------|----------|---------------|-----------|-----------------------|--------------|------------|------|----------|---------|
|              | Fg %               | Fv % | Afl % | DON mg/kg     | FB1+B2 mg/kg | AFB1 ppb | F. Check      | Af. Check | DON mg/kg             | FB1+B2 mg/kg | AFB1 mg/kg |      |          |         |
| ES Harmonium | 67.5               | 85.8 | 74.2  | 62.8          | 68.5         | 95.1     | 18.0          | 100.0     | 96.5                  | 85.7         | 99.7       | 77.6 | 576      | 380     |
| Koregraf     | 53.0               | 73.7 | 58.5  | 69.6          | 63.0         | 97.1     | 68.4          | 100.0     | 100.0                 | 94.8         | 69.2       | 77.0 | 309      | 410     |
| Sy Talisman  | 61.8               | 75.0 | 53.1  | 92.6          | 72.9         | 94.4     | 10.8          | 100.0     | 79.9                  | 90.4         | 99.8       | 75.5 | 697      | 250     |
| Valkür       | 18.6               | 93.9 | 91.4  | 18.2          | 76.8         | 83.7     | 82.0          | 100.0     | 64.5                  | 85.7         | 100.0      | 74.1 | 863      | 731     |
| Armagnac     | 44.0               | 85.9 | 81.1  | 75.0          | 86.9         | 92.2     | 55.7          | 40.0      | 35.2                  | 71.9         | 99.2       | 69.7 | 503      | 490     |
| Konfites     | 71.3               | 62.0 | 40.1  | 82.0          | 47.6         | 95.8     | 31.3          | 100.0     | 52.8                  | 66.7         | 99.8       | 68.1 | 583      | 430     |
| P9718E       | 38.2               | 69.7 | 57.3  | 0.0           | 77.2         | 49.3     | 70.6          | 100.0     | 95.4                  | 79.3         | 99.7       | 67.0 | 897      | 390     |
| P9415        | 9.4                | 63.0 | 52.7  | 51.4          | 79.2         | 97.0     | 21.8          | 100.0     | 83.8                  | 58.9         | 100.0      | 65.2 | 937      | 350     |
| Kleopatras   | 1.0                | 72.8 | 82.7  | 26.5          | 72.9         | 75.4     | 46.5          | 100.0     | 90.3                  | 59.1         | 90.1       | 65.2 | 899      | 630     |
| SY Zephir    | 4.1                | 76.8 | 66.8  | 71.9          | 73.7         | 87.3     | 47.3          | 40.0      | 82.5                  | 58.2         | 99.7       | 64.4 | 696      | 390     |
| Korimbos     | 59.4               | 91.4 | 80.2  | 24.7          | 14.8         | 96.5     | 75.1          | 100.0     | 2.9                   | 94.8         | 64.3       | 64.0 | 1216     | 575     |
| Kathedralis  | 37.5               | 58.2 | 0.0   | 86.8          | 43.5         | 71.3     | 29.9          | 100.0     | 92.6                  | 69.3         | 100.0      | 62.6 | 1041     | 490     |
| P0725        | 55.0               | 72.4 | 80.6  | 71.7          | 38.2         | 51.3     | 42.1          | 40.0      | 100.0                 | 97.9         | 30.5       | 61.8 | 588      | 560     |
| ES Lagoon    | 44.1               | 80.1 | 58.0  | 61.5          | 53.2         | 28.8     | 37.1          | 40.0      | 100.0                 | 60.5         | 98.3       | 60.1 | 567      | 460     |
| DKC 5830     | 51.7               | 67.6 | 25.1  | 53.5          | 51.2         | 80.5     | 45.1          | 100.0     | 39.4                  | 0.0          | 100.0      | 55.8 | 914      | 560     |
| Illango      | 43.6               | 67.0 | 37.8  | 53.7          | 60.6         | 15.1     | 41.5          | 0.0       | 98.7                  | 86.8         | 0.0        | 45.9 | 1044     | 530     |
| Sy Zoan      | 0.0                | 71.2 | 72.9  | 4.6           | 0.0          | 0.0      | 41.0          | 0.0       | 100.0                 | 70.7         | 100.0      | 41.8 | 1782     | 560     |
| DKC 4541     | 30.5               | 0.0  | 7.0   | 51.7          | 40.0         | 86.1     | 0.0           | 40.0      | 0.0                   | 45.6         | 100.0      | 36.4 | 1174     | 370     |
| Mean         | 38.4               | 74.5 | 60.0  | 56.4          | 60.0         | 76.3     | 44.9          | 76.5      | 77.3                  | 75.1         | 91.2       | 66.6 | 899      | 503     |

Fg = *F. graminearum*; Fv = *F. verticillioides*; Afl = *A. flavus*; DON = deoxynivalenol; FB = fumonisin B<sub>1</sub>+B<sub>2</sub>; AFB1 = aflatoxin B<sub>1</sub>; F; Check = natural fusarium infection in the control; Af. Check = *A. flavus* natural infection in the control; FAO No. = earliness or lateness of the hybrids according to the FAO international methodology.



**Table S9.** Kernel resistance tests of maize hybrids to toxigenic fungi. Toxin contamination for one percentage of visual infection in maize resistance test against *F. graminearum*, *F. verticillioides*, and *A. flavus*, 2017-2018, and 2019–2020.

| Hybrid<br>2017/2018  | Rates between toxin (mg/kg)<br>and ear rot%, mg/kg |                            |                | Mean        | Varian-<br>ce | Hybrid<br>2019/2020 | Rates between toxin (mg/kg)<br>and ear rot%, mg/kg |                            |              | Mean        | Varian-<br>ce |
|----------------------|--|----------------------------|----------------|-------------|---------------|---------------------|--|----------------------------|--------------|-------------|---------------|
|                      | DON/<br>GER  | FB <sub>1,2</sub> /<br>FER | AFB1/<br>AER   |             |               |                     | DON/<br>GER  | FB <sub>1,2</sub> /<br>FER | AFB1/<br>AER |             |               |
| <b>DKC 4541</b>      | 0.95   | 2.84                       | 0.162          | 1.32        | 1.9           | DKC 4541            | 1.98   | 2.48                       | 2.967        | 2.48        | 0.2           |
| DKC 5830             | 1.11   | 3.59                       | 1.092          | 1.93        | 2.1           | DKC 5830            | 2.75   | 6.25                       | 4.100        | 4.37        | 3.1           |
| Korimbos             | 3.04   | 21.53                      | 6.181          | 10.25       | 97.9          | Korimbos            | 5.30   | 40.50                      | 7.863        | 17.89       | 385.1         |
| Valkür               | 2.90   | 11.39                      | 0.473          | 4.92        | 32.9          | Valkür              | 2.87   | 15.50                      | 0.136        | 6.17        | 67.2          |
| P 9537               | 0.62   | 9.44                       | 0.152          | 3.41        | 27.4          | <b>Sy Talisman</b>  | 0.55   | 4.50                       | 0.151        | 1.74        | 5.8           |
| PR37F80              | 0.71   | 8.95                       | 0.285          | 3.31        | 23.9          | <b>Konfites</b>     | 0.61   | 5.61                       | 0.413        | 2.21        | 8.7           |
| <b>Fornad</b>        | 0.76   | 3.79                       | 0.479          | 1.67        | 3.4           | <b>SY Zephir</b>    | 0.84   | 4.73                       | 0.263        | 1.94        | 5.9           |
| <b>DKC 4590</b>      | 0.78   | 6.34                       | 0.144          | 2.42        | 11.6          | <b>Armagnac</b>     | 1.28   | 3.78                       | 0.367        | 1.81        | 3.1           |
| <b>DKC 4943</b>      | 0.92   | 2.94                       | 0.112          | 1.32        | 2.1           | P9415               | 1.53   | 2.30                       | 5.573        | 3.14        | 4.6           |
| 4517                 | 0.96   | 13.10                      | 0.471          | 4.84        | 51.2          | <b>Konfites</b>     | 1.79   | 5.72                       | 0.154        | 2.55        | 8.2           |
| P 9911               | 1.03   | 21.49                      | 0.459          | 7.66        | 143.5         | P0725               | 1.80   | 9.16                       | 0.557        | 3.84        | 21.6          |
| <b>DKC 4717</b>      | 1.04   | 2.44                       | 0.167          | 1.21        | 1.3           | Koregraf            | 1.85   | 5.88                       | 3.733        | 3.82        | 4.1           |
| <b>P 9903</b>        | 1.12   | 5.34                       | 0.188          | 2.21        | 7.5           | ES Lagoon           | 1.97   | 9.72                       | 0.891        | 4.19        | 23.2          |
| <b>Cardixxio Duo</b> | 1.25   | 5.38                       | 0.102          | 2.24        | 7.7           | Kleopatras          | 2.12   | 4.11                       | 2.552        | 2.93        | 1.1           |
| DKC 5542             | 1.39   | 4.05                       | 3.442          | 2.96        | 1.9           | Illango             | 2.34   | 4.94                       | 0.622        | 2.64        | 4.7           |
| Siló Star            | 1.56   | 4.02                       | 1.284          | 2.29        | 2.3           | Sy Zoan             | 2.72   | 14.17                      | 0.322        | 5.74        | 54.8          |
| P 9241               | 1.60   | 7.15                       | 0.199          | 2.98        | 13.5          | ES Harmonium        | 3.27   | 9.13                       | 0.842        | 4.41        | 18.2          |
| Szegedi 521          | 2.69   | 13.51                      | 2.538          | 6.25        | 39.6          | P9718E              | 4.62   | 3.10                       | 3.100        | 3.61        | 0.8           |
| <b>Mean</b>          | <b>1.36</b>  | <b>8.18</b>                | <b>0.996</b>   | <b>3.20</b> | <b>24.1</b>   | <b>Mean</b>         | <b>2.23</b>  | <b>8.42</b>                | <b>1.92</b>  | <b>4.19</b> | <b>34.5</b>   |
| Max/Min*             | 4.86   | 8.83                       | 60.59          |             |               | Max/Min             | 9.64   | 17.61                      | 57.93        |             |               |
| Risk group           | Low  | Low to medium              | Medium to high |             |               | High                |  |                            |              |             |               |

**Bold:** Hybrid names with low toxin production as a percentage of visual infection, good resistance, and high stability to all toxigenic fungi. \*Rate between the maximum and minimum values in the column