

Mycotoxin Occurrence in 2021 US Corn Ingredients



JUNE 2022

MYCOTOXIN *monthly*



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DSM

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Mycotoxins & Analysis



LC-MS/MS



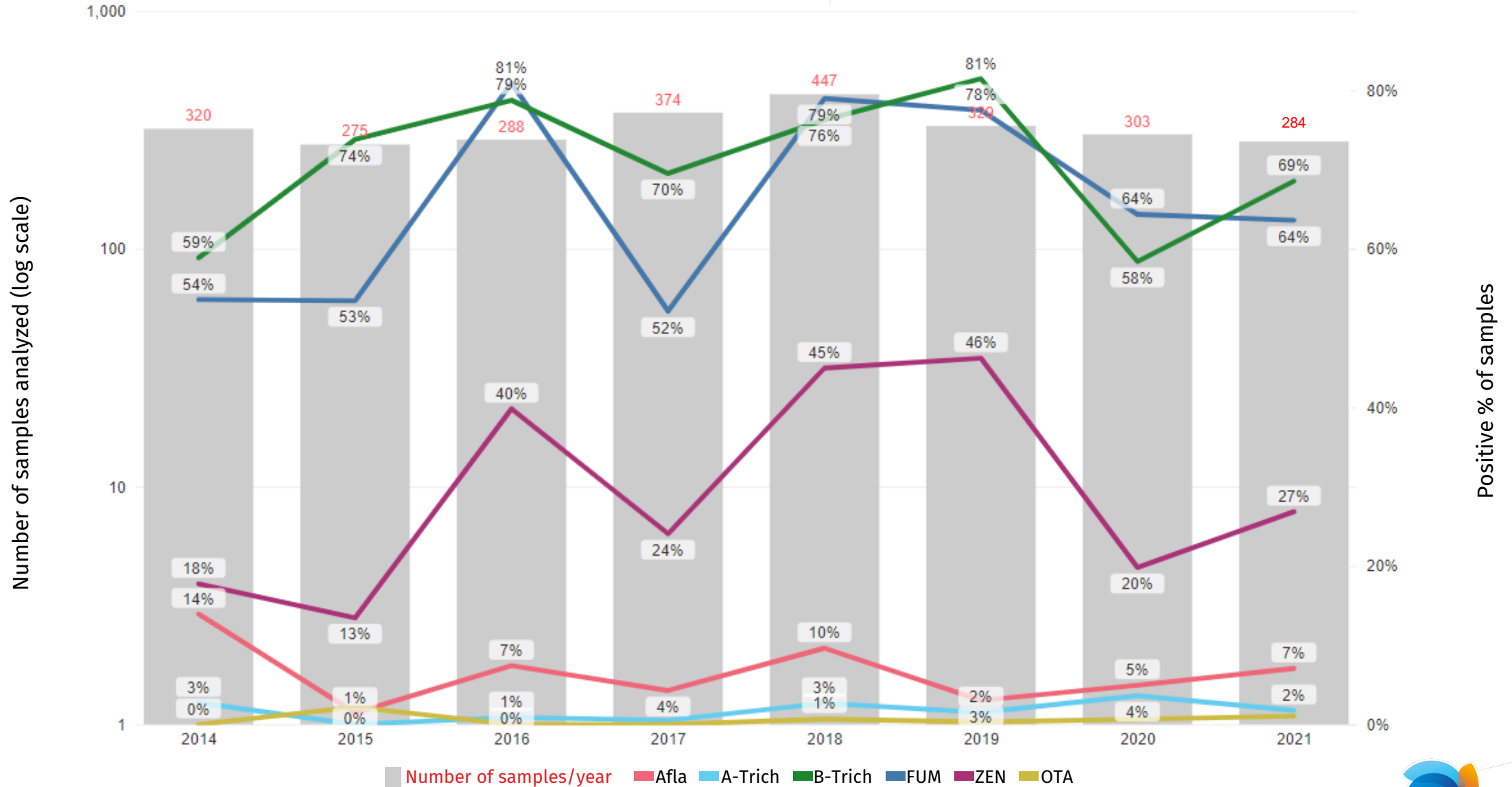
The survey results represent samples sent in for surveillance testing only and does not include any sample submitted following clinical signs.

| Mycotoxin Group* | Mycotoxins | Limit of Detection (ppb) |
|----------------------------|--------------------------------|--------------------------|
| Aflatoxins (Afla) | Aflatoxin B1 | 1.3 |
| | Aflatoxin B2 | 1.2 |
| | Aflatoxin G1 | 1.1 |
| | Aflatoxin G2 | 1.6 |
| A-Trichothecenes (A-Trich) | T-2 Toxin | 100.0 |
| | HT-2 Toxin | 100.0 |
| | Neosolaniol | 100.0 |
| | Diacetoxyscirpenol (DAS) | 100.0 |
| B-Trichothecenes (B-Trich) | Deoxynivalenol (DON/Vomitoxin) | 100.0 |
| | Acetyldeoxynivalenol (AcDON) | 100.0 |
| | Nivalenol (NIV) | 100.0 |
| | Fusarenon X (FusX) | 100.0 |
| Fumonisin (FUM) | Fumonisin B1 | 100.0 |
| | Fumonisin B2 | 100.0 |
| | Fumonisin B3 | 100.0 |
| Zearalenone (ZEN) | Zearalenone (ZEN) | 51.7 |
| Ochratoxin A (OTA) | Ochratoxin A (OTA) | 1.1 |

*Results are reported as the summation of mycotoxin levels detected per Mycotoxin Group. (For example, B-Trich represents total contamination detected for DON + AcDON + NIV + FusX)

2021 US Corn (as-fed basis)

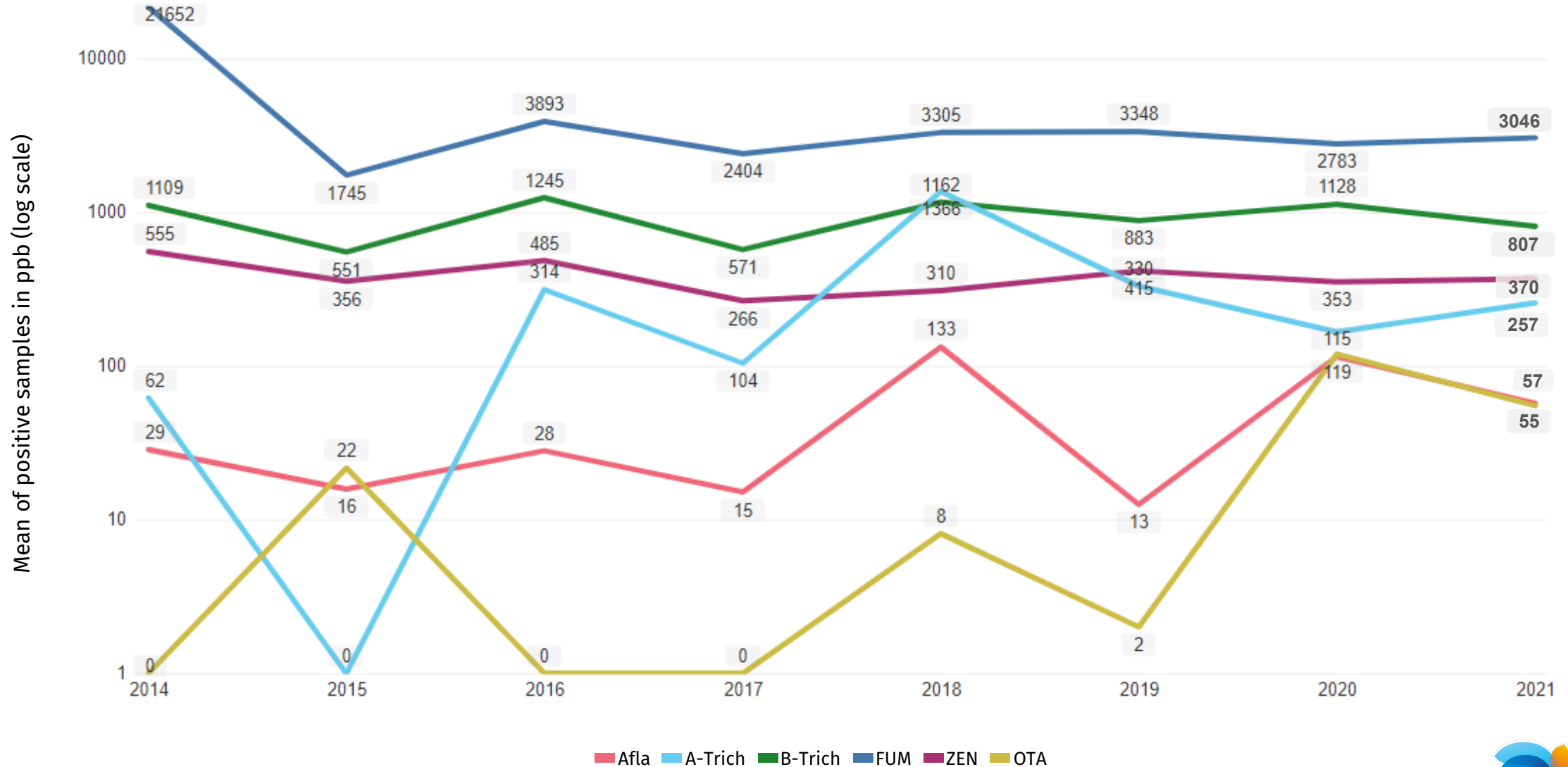
Occurrence Trend in 2021 US Corn



Based on the samples analyzed.



Mean of Positives Trend in 2021 US Corn

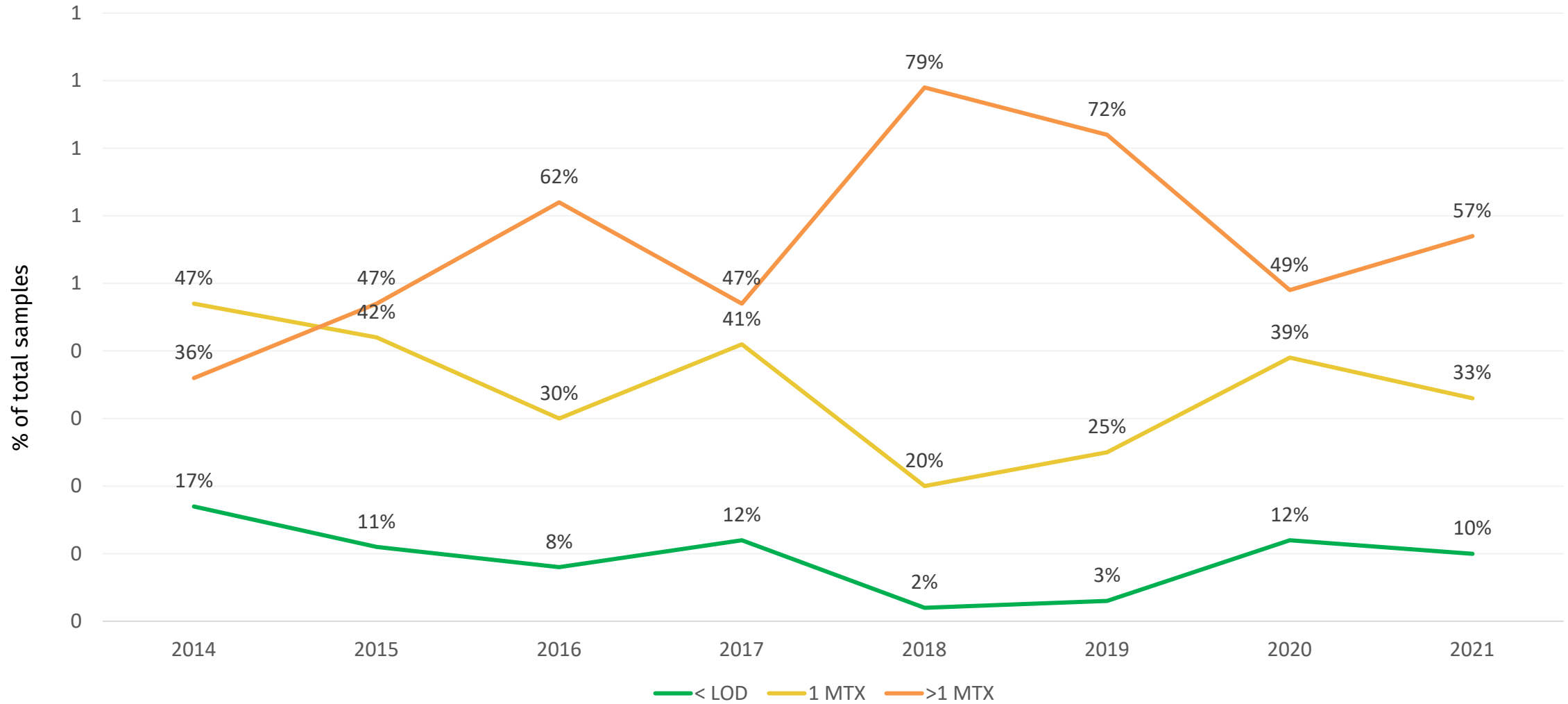


— Afla — A-Trich — B-Trich — FUM — ZEN — OTA

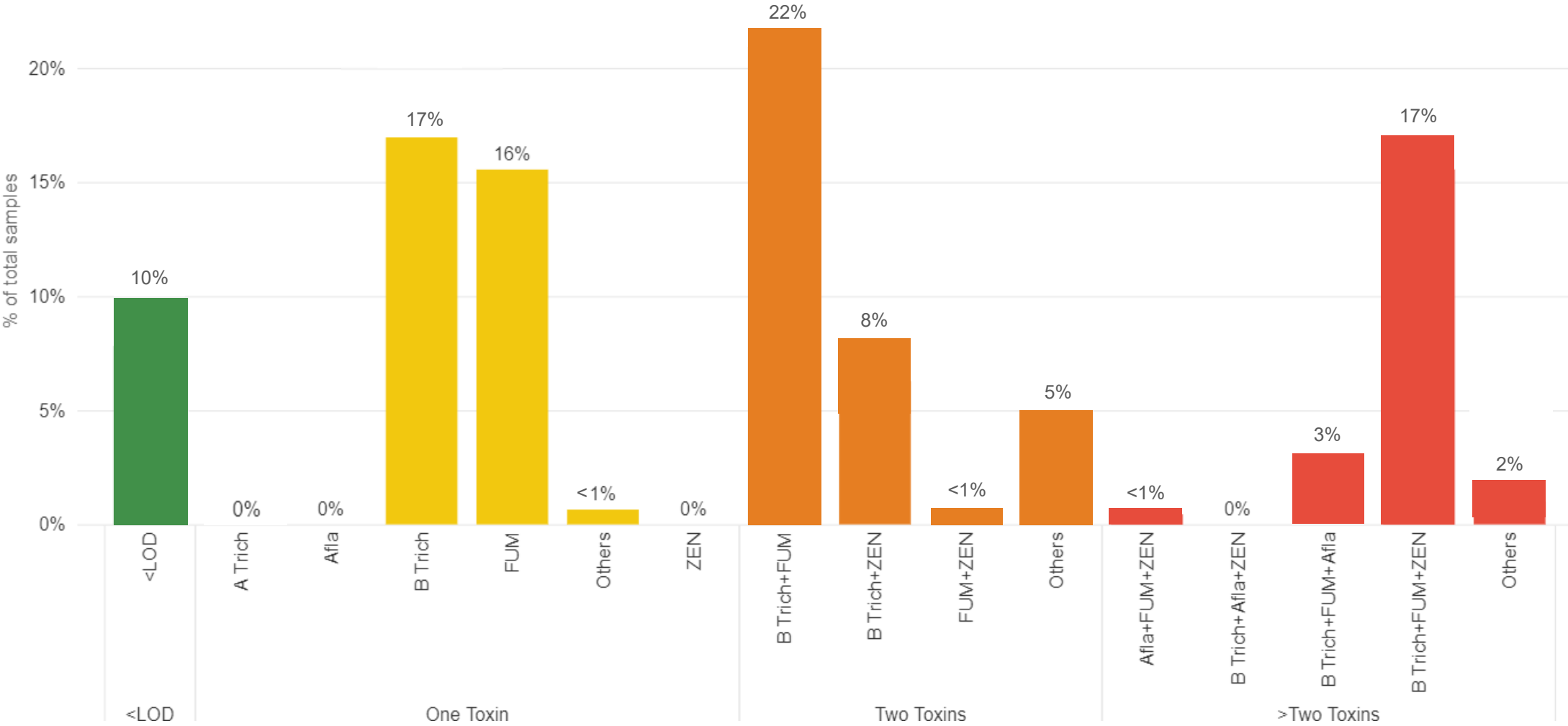
Based on the samples analyzed.



Co-occurrence Trend in 2021 US Corn



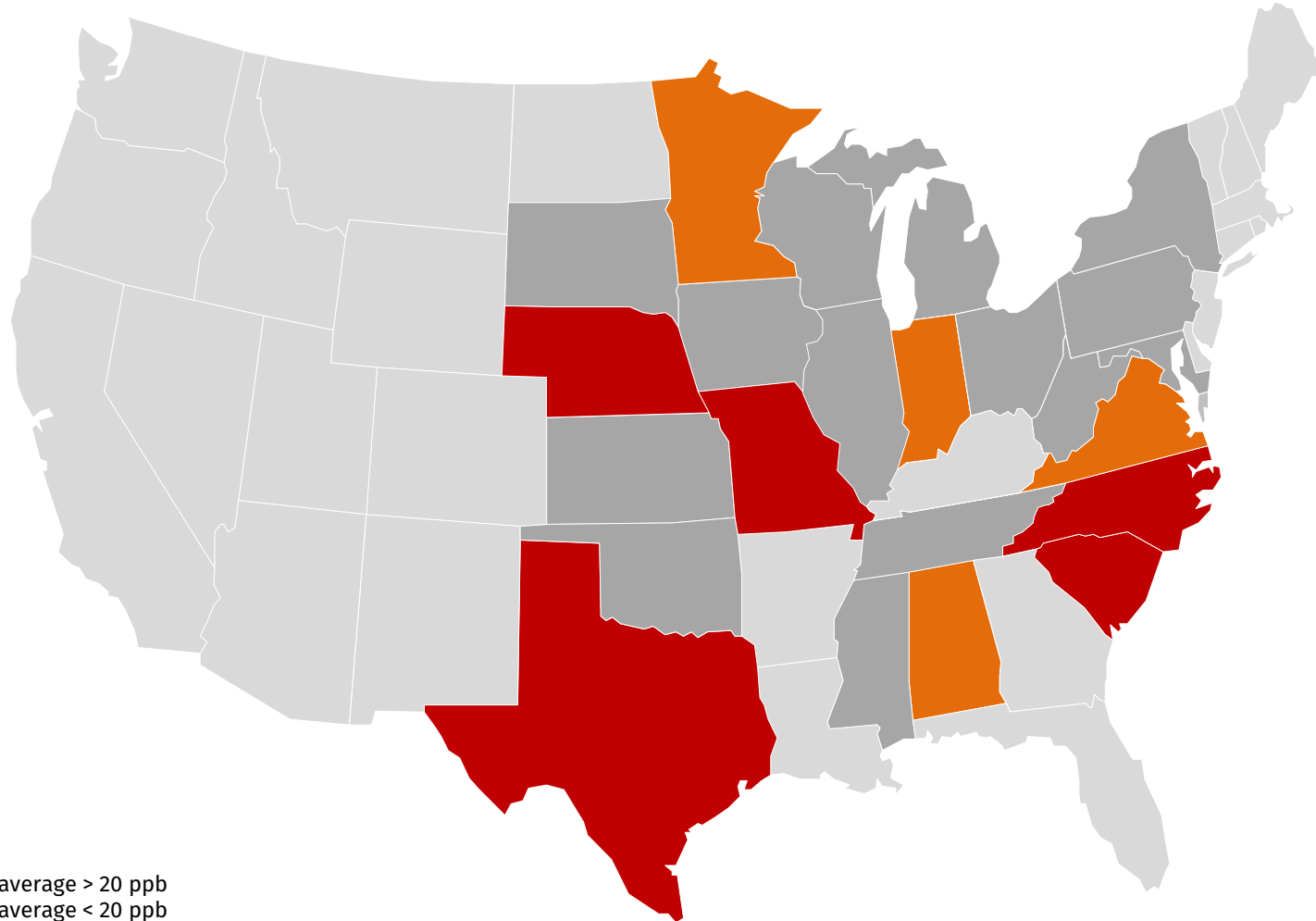
Co-occurrence Profile in 2021 US Corn



Based on the samples analyzed.



2021 Corn Risk by State – Afla

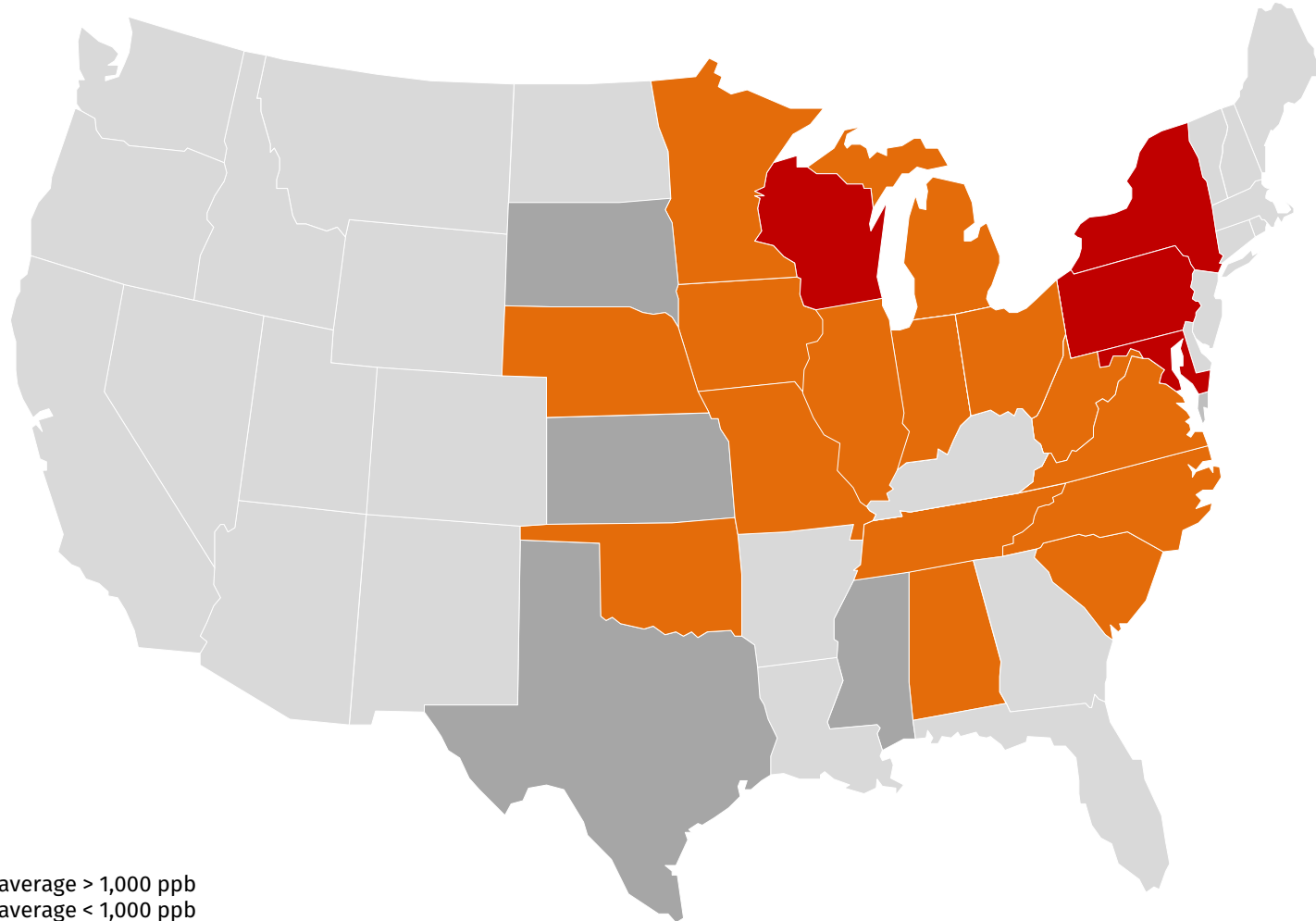


- State with average > 20 ppb
- State with average < 20 ppb
- State with samples < LOD (1 ppb)
- No sample submitted

| State | Number of Samples | % Positive Samples | Avg of Positive Samples |
|-------|-------------------|--------------------|-------------------------|
| NC | 24 | 33 | 110 |
| SC | 12 | 25 | 50 |
| NE | 14 | 7 | 37 |
| MO | 20 | 5 | 25 |
| TX | 4 | 25 | 21 |
| AL | 22 | 9 | 12 |
| IN | 15 | 7 | 4 |
| VA | 9 | 22 | 2 |
| MN | 23 | 4 | 2 |
| IA | 21 | 0 | 0 |
| IL | 21 | 0 | 0 |
| KS | 3 | 0 | 0 |
| MD | 3 | 0 | 0 |
| MI | 15 | 0 | 0 |
| MS | 3 | 0 | 0 |
| NY | 1 | 0 | 0 |
| OH | 20 | 0 | 0 |
| OK | 3 | 0 | 0 |
| PA | 3 | 0 | 0 |
| SD | 6 | 0 | 0 |
| TN | 5 | 0 | 0 |
| WI | 36 | 0 | 0 |
| WV | 1 | 0 | 0 |



2021 Corn Risk by State – B-Trich

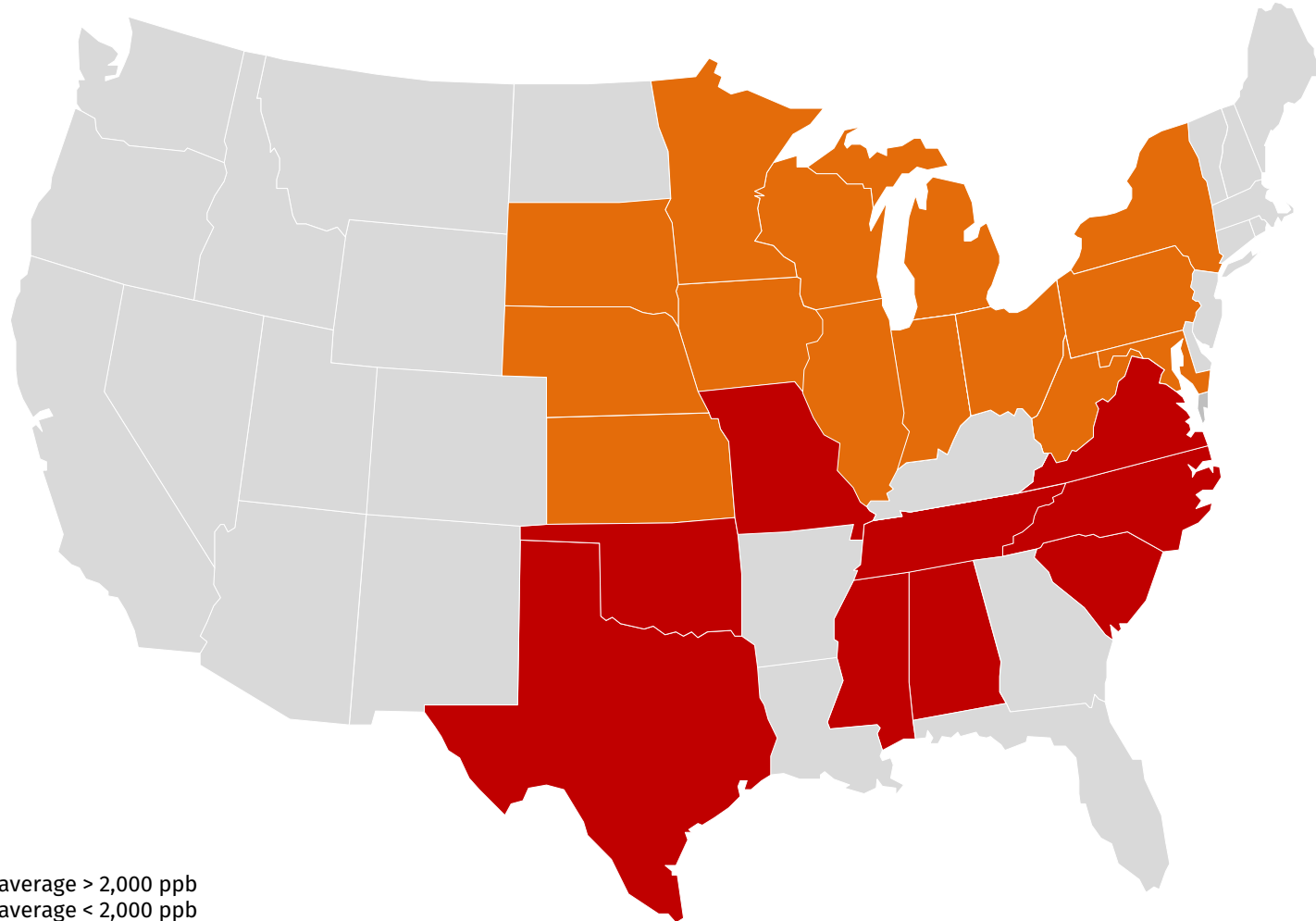


- State with average > 1,000 ppb
- State with average < 1,000 ppb
- State with samples < LOD (100 ppb)
- No sample submitted

| State | Number of Samples | % Positive Samples | Avg of Positive Samples |
|-------|-------------------|--------------------|-------------------------|
| PA | 3 | 100 | 2624 |
| NY | 1 | 100 | 1726 |
| WI | 36 | 92 | 1619 |
| MD | 3 | 100 | 1193 |
| OH | 20 | 85 | 999 |
| MI | 15 | 100 | 995 |
| IN | 15 | 87 | 672 |
| NC | 24 | 50 | 651 |
| IL | 21 | 90 | 559 |
| IA | 21 | 95 | 523 |
| VA | 9 | 89 | 508 |
| TN | 5 | 100 | 475 |
| MO | 20 | 60 | 403 |
| NE | 14 | 79 | 371 |
| MN | 23 | 22 | 312 |
| AL | 22 | 45 | 249 |
| SC | 12 | 42 | 204 |
| WV | 1 | 100 | 167 |
| OK | 3 | 33 | 117 |
| KS | 3 | 0 | 0 |
| MS | 3 | 0 | 0 |
| SD | 6 | 0 | 0 |
| TX | 4 | 0 | 0 |



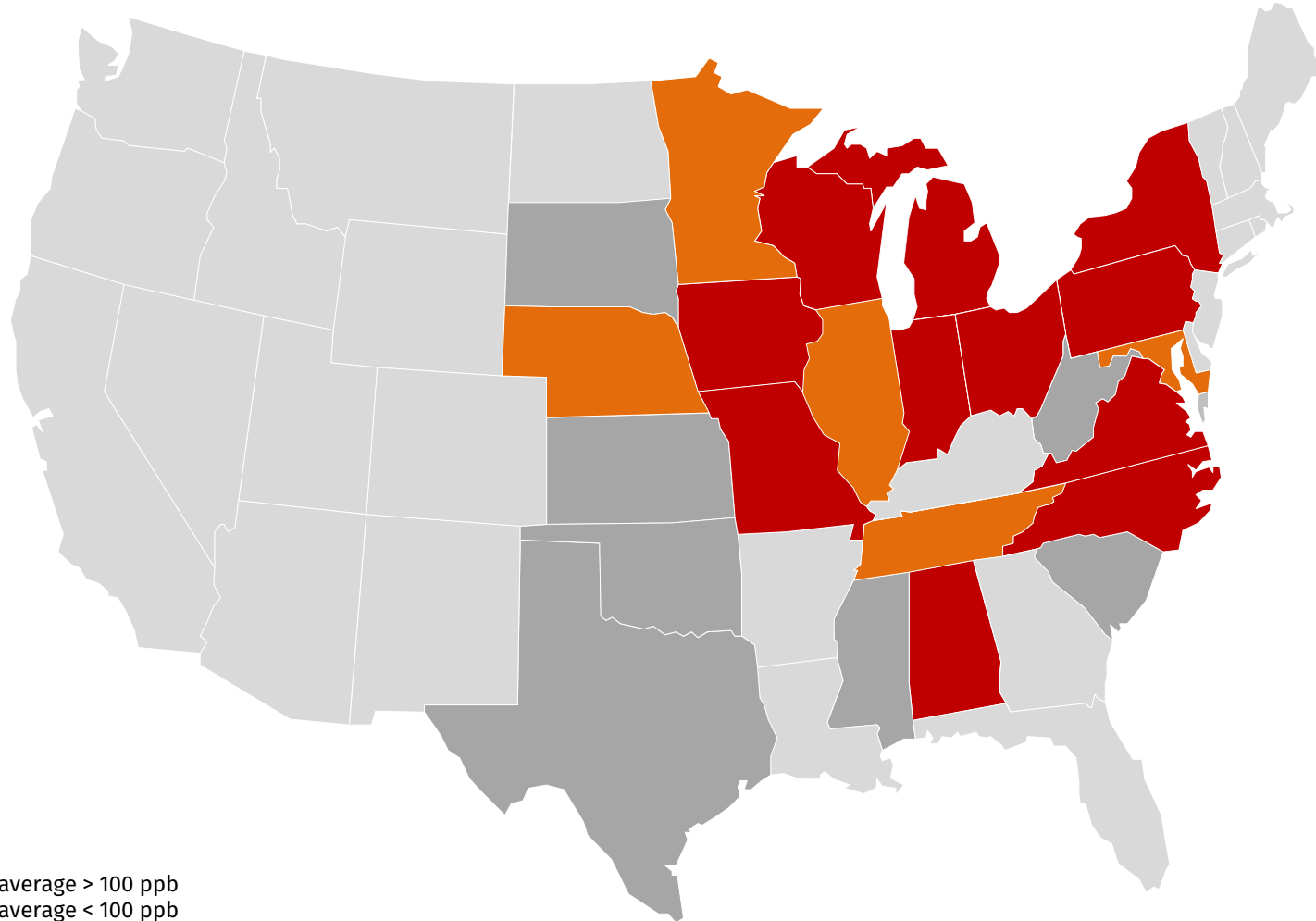
2021 Corn Risk by State – FUM



- State with average > 2,000 ppb
- State with average < 2,000 ppb
- State with samples < LOD (100 ppb)
- No sample submitted

| State | Number of Samples | % Positive Samples | Avg of Positive Samples |
|-------|-------------------|--------------------|-------------------------|
| MO | 20 | 95 | 8558 |
| NC | 24 | 88 | 7205 |
| TN | 5 | 100 | 5840 |
| MS | 3 | 100 | 5667 |
| OK | 3 | 100 | 4200 |
| TX | 4 | 100 | 3000 |
| VA | 9 | 100 | 2844 |
| SC | 12 | 100 | 2550 |
| AL | 22 | 91 | 2455 |
| IN | 15 | 53 | 1525 |
| KS | 3 | 100 | 1467 |
| NE | 14 | 79 | 1091 |
| MN | 23 | 22 | 1060 |
| WV | 1 | 100 | 700 |
| MD | 3 | 67 | 650 |
| IL | 21 | 57 | 633 |
| MI | 15 | 47 | 629 |
| NY | 1 | 100 | 600 |
| IA | 21 | 43 | 567 |
| OH | 20 | 55 | 364 |
| PA | 3 | 33 | 300 |
| WI | 36 | 36 | 254 |
| SD | 6 | 17 | 100 |

2021 Corn Risk by State – ZEN



- State with average > 100 ppb
- State with average < 100 ppb
- State with samples < LOD (51.7 ppb)
- No sample submitted

| State | Number of Samples | % Positive Samples | Avg of Positive Samples |
|-------|-------------------|--------------------|-------------------------|
| MI | 15 | 53 | 1620 |
| NY | 1 | 100 | 522 |
| WI | 36 | 42 | 399 |
| AL | 22 | 18 | 336 |
| PA | 3 | 67 | 278 |
| IN | 15 | 40 | 247 |
| OH | 20 | 45 | 197 |
| MO | 20 | 5 | 182 |
| VA | 9 | 33 | 166 |
| NC | 24 | 29 | 125 |
| IA | 21 | 33 | 123 |
| IL | 21 | 24 | 97 |
| MD | 3 | 33 | 88 |
| MN | 23 | 4 | 77 |
| TN | 5 | 60 | 69 |
| NE | 14 | 21 | 64 |
| KS | 3 | 0 | 0 |
| MS | 3 | 0 | 0 |
| OK | 3 | 0 | 0 |
| SC | 12 | 0 | 0 |
| SD | 6 | 0 | 0 |
| TX | 4 | 0 | 0 |
| WV | 1 | 0 | 0 |



Mycotoxin Survey Summary – 2021 US Corn



90% positive vs.
88% in 2020



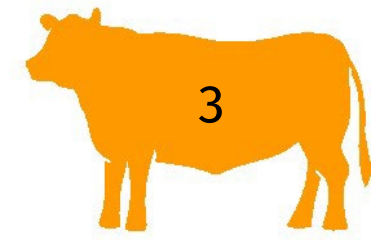
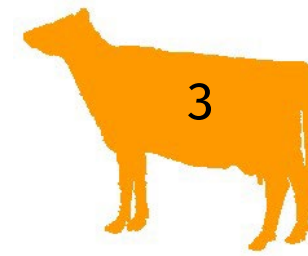
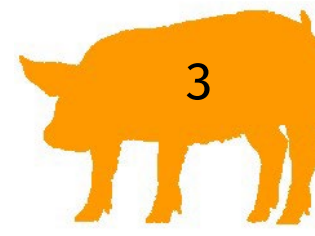
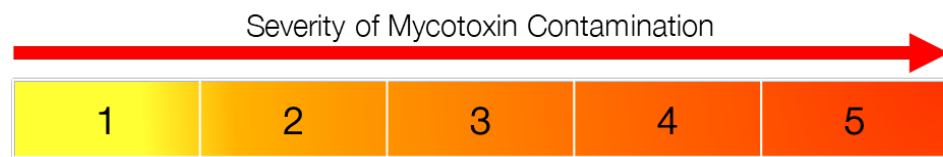
57% >1 MTX vs.
49% in 2020

B-Trich: 69% vs. 58%

FUM: 64% vs. 64%

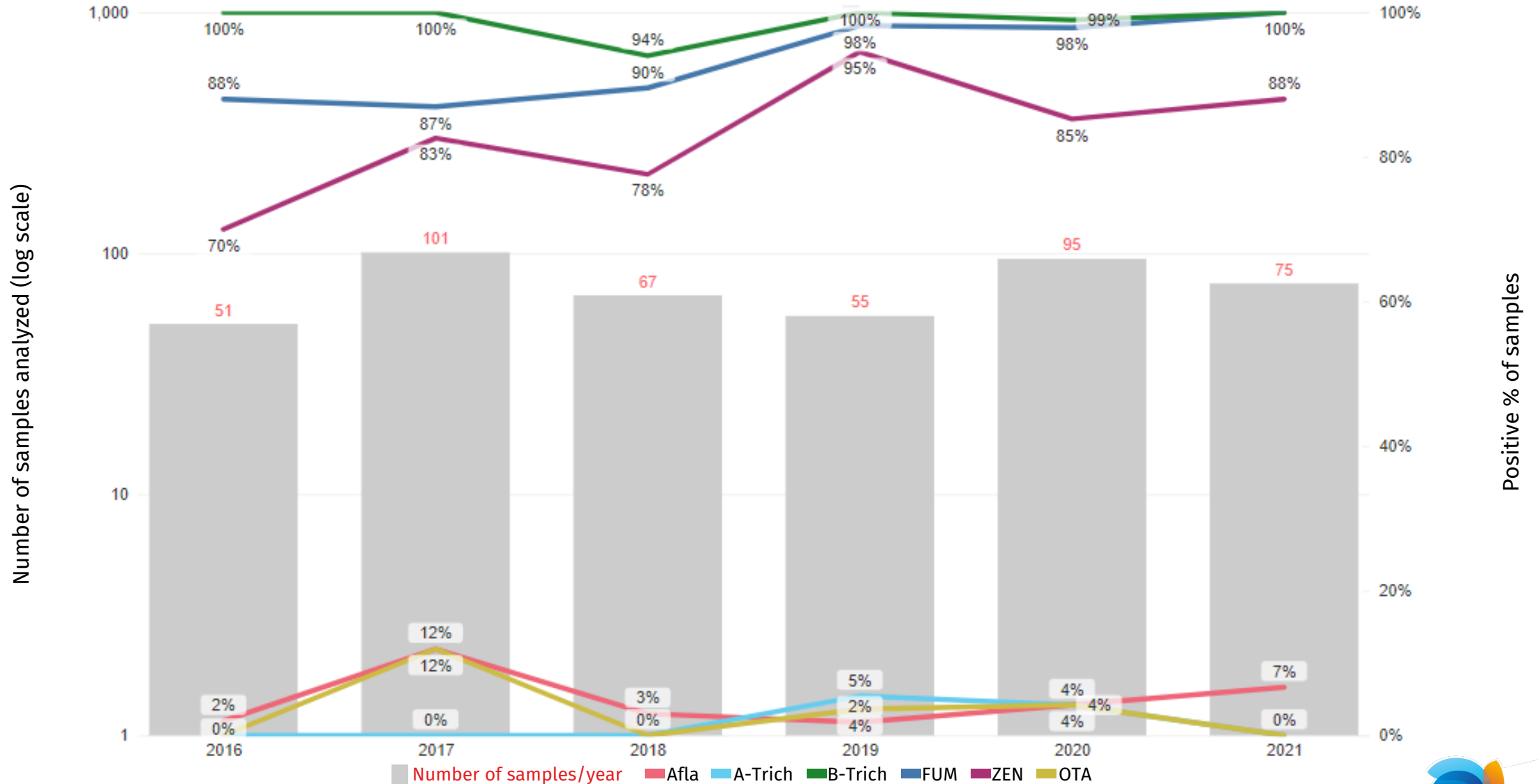
ZEN: 27% vs. 20%

Forecasted potential risk for livestock production*:

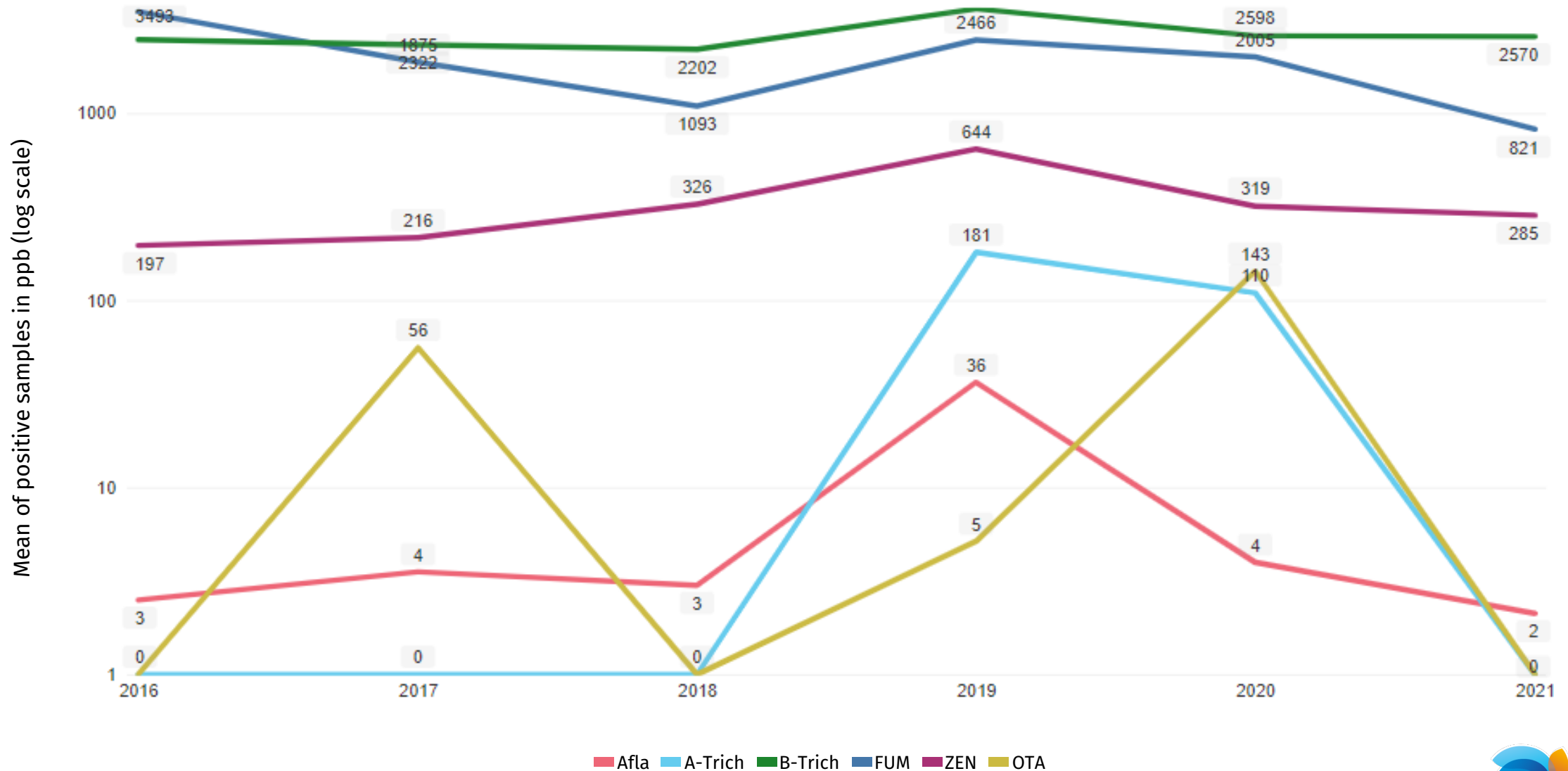


2021 US Corn By-Products (as-fed basis)

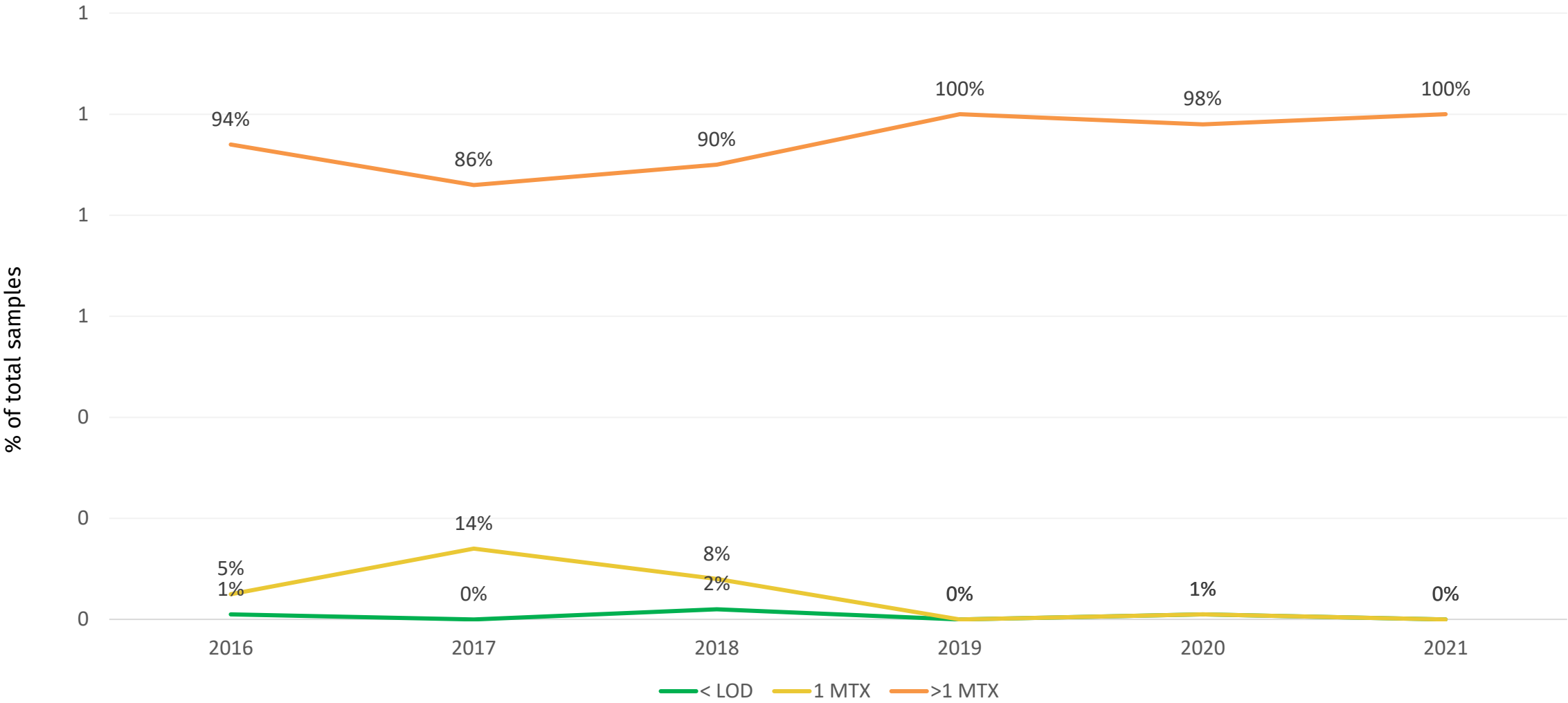
Occurrence Trend in 2021 US Corn By-Products



Mean of Positives Trend in 2021 US Corn By-Products



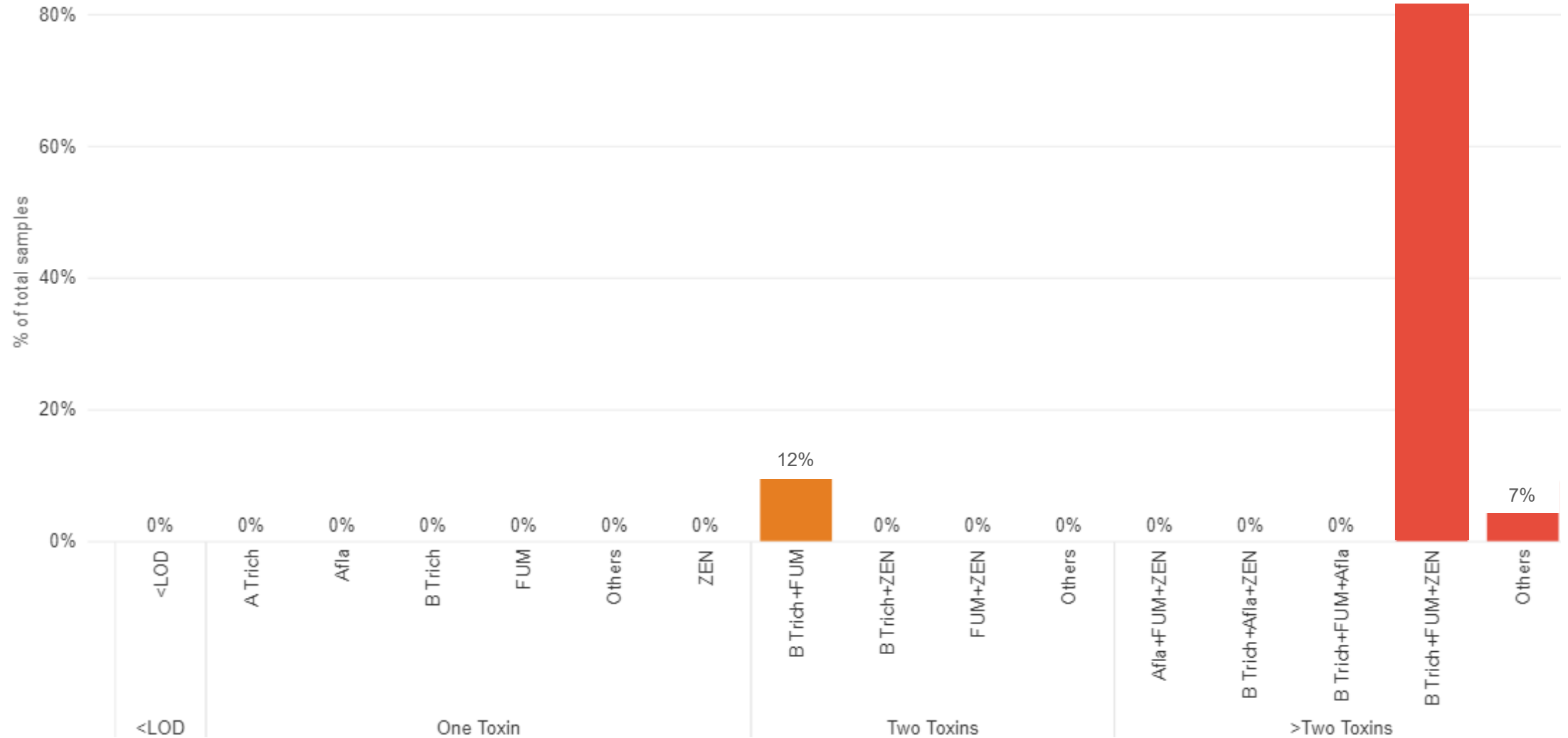
Co-occurrence Trend in 2021 US Corn By-Products



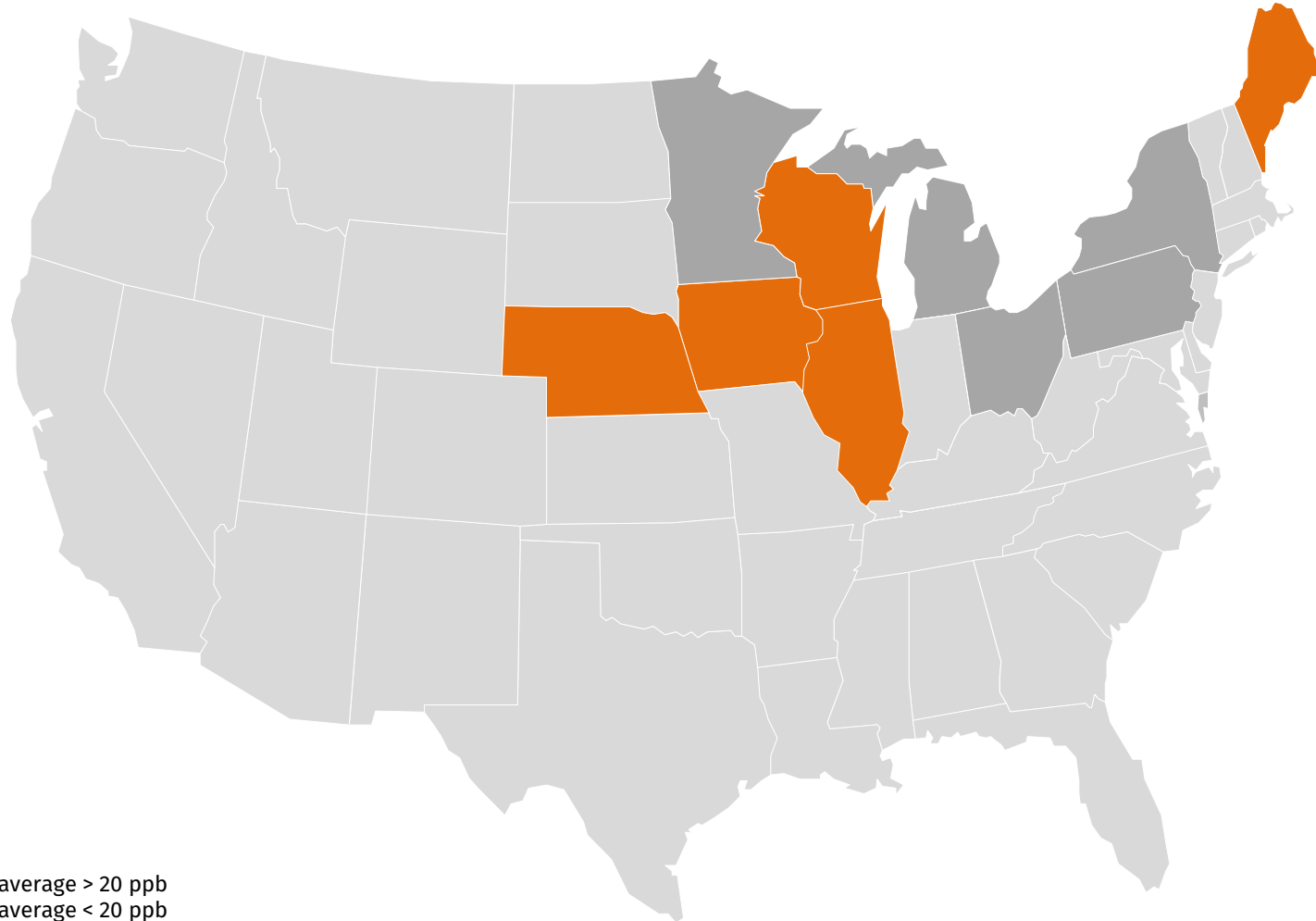
Based on the samples analyzed.



Co-occurrence Profile in 2021 US Corn By-Products



2021 Corn By-Products Risk by State – Afla

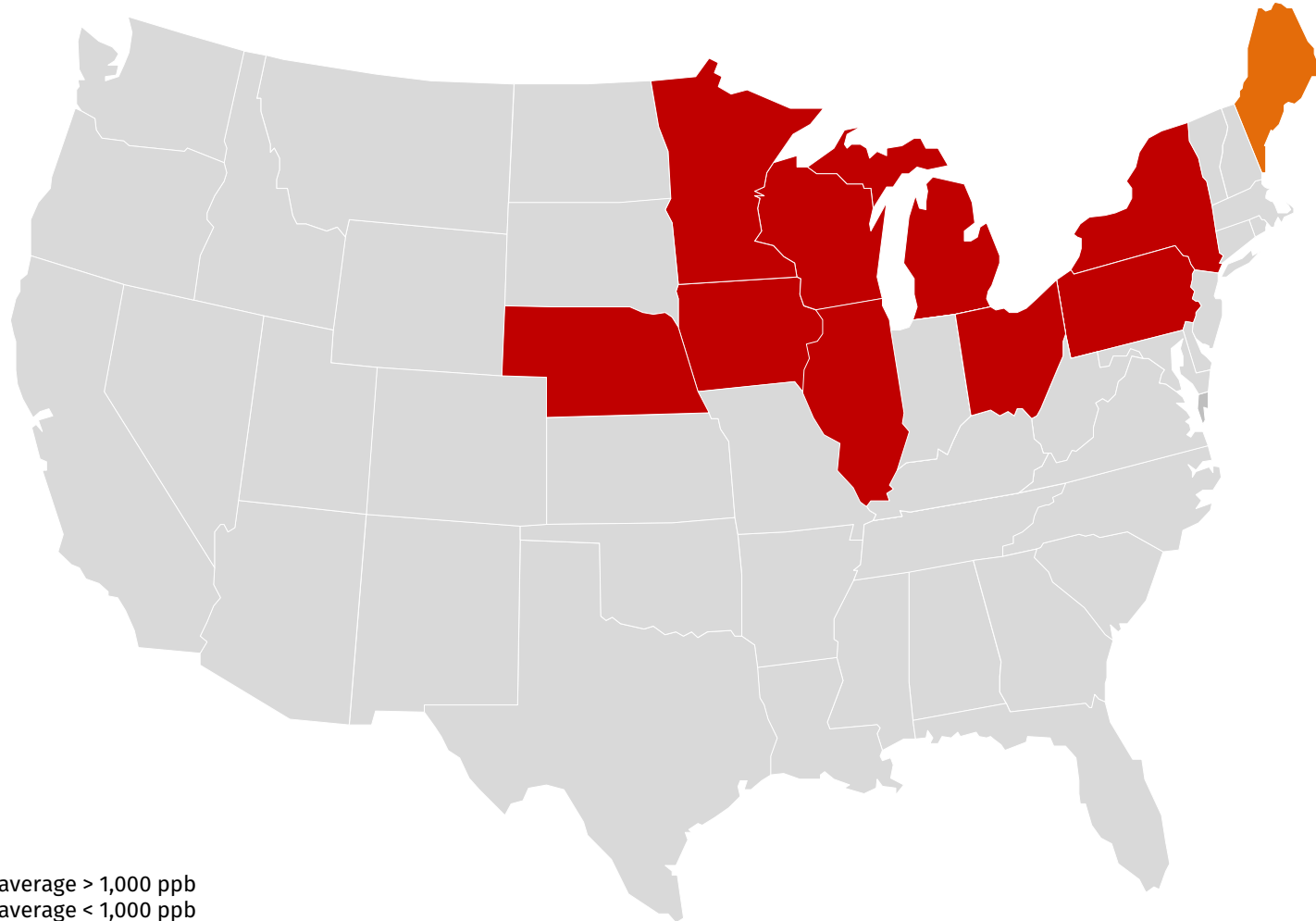


| State | Number of Samples | % Positive Samples | Avg of Positive Samples |
|-------|-------------------|--------------------|-------------------------|
| NE | 3 | 33% | 4 |
| IA | 24 | 4% | 2 |
| IL | 12 | 8% | 2 |
| ME | 1 | 100% | 2 |
| WI | 22 | 5% | 1 |
| MI | 3 | 0% | 0 |
| MN | 2 | 0% | 0 |
| NY | 2 | 0% | 0 |
| OH | 4 | 0% | 0 |
| PA | 2 | 0% | 0 |

- State with average > 20 ppb
- State with average < 20 ppb
- State with samples < LOD (1 ppb)
- No sample submitted



2021 Corn By-Products Risk by State – B-Trich

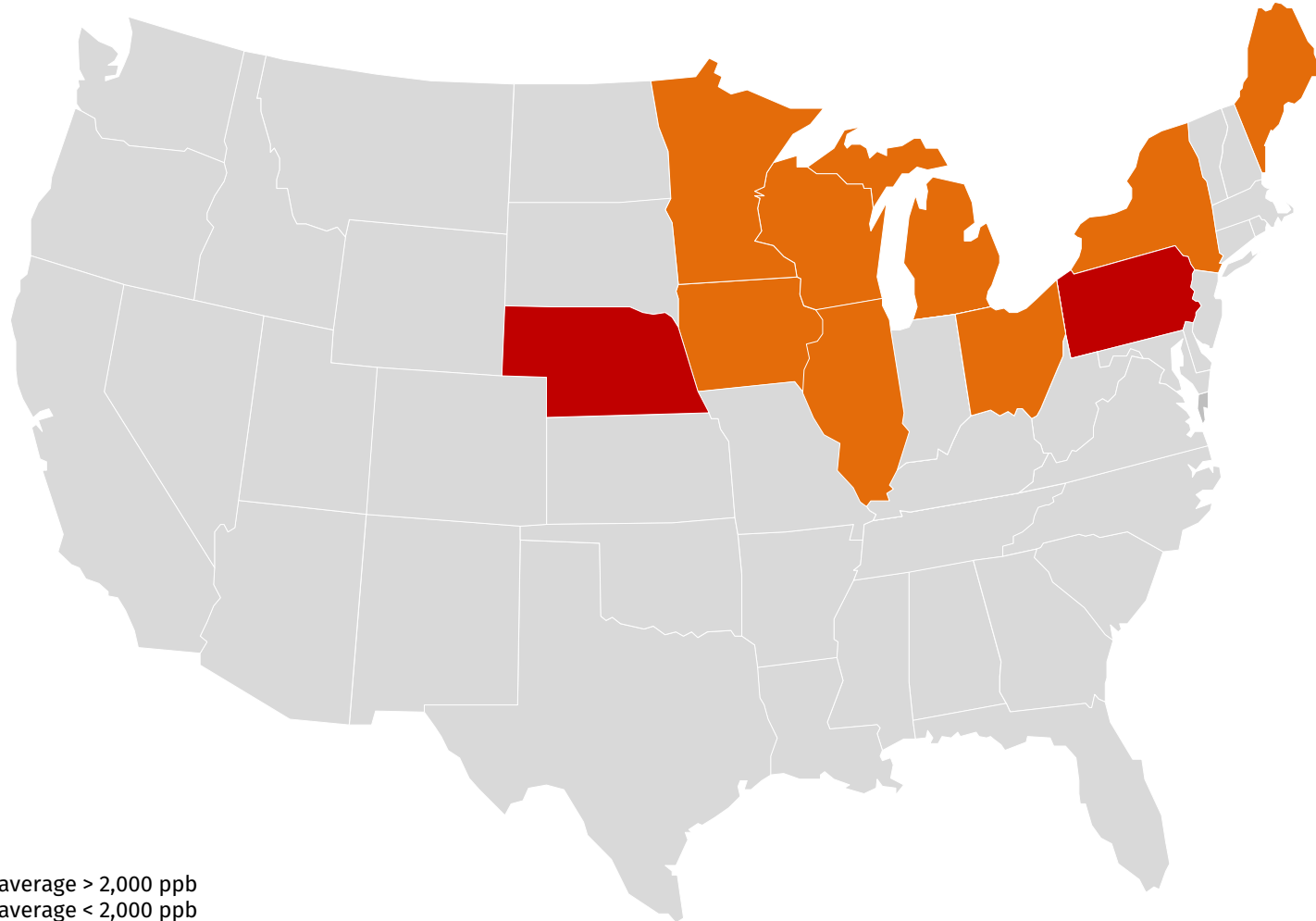


- State with average > 1,000 ppb
- State with average < 1,000 ppb
- State with samples < LOD (100 ppb)
- No sample submitted

| State | Number of Samples | % Positive Samples | Avg of Positive Samples |
|-------|-------------------|--------------------|-------------------------|
| PA | 2 | 100% | 8251 |
| OH | 4 | 100% | 5365 |
| MI | 3 | 100% | 4109 |
| NY | 2 | 100% | 3745 |
| WI | 22 | 100% | 3162 |
| NE | 3 | 100% | 2431 |
| IL | 12 | 100% | 1560 |
| IA | 24 | 100% | 1499 |
| MN | 2 | 100% | 1383 |
| ME | 1 | 100% | 662 |



2021 Corn By-Products Risk by State – FUM

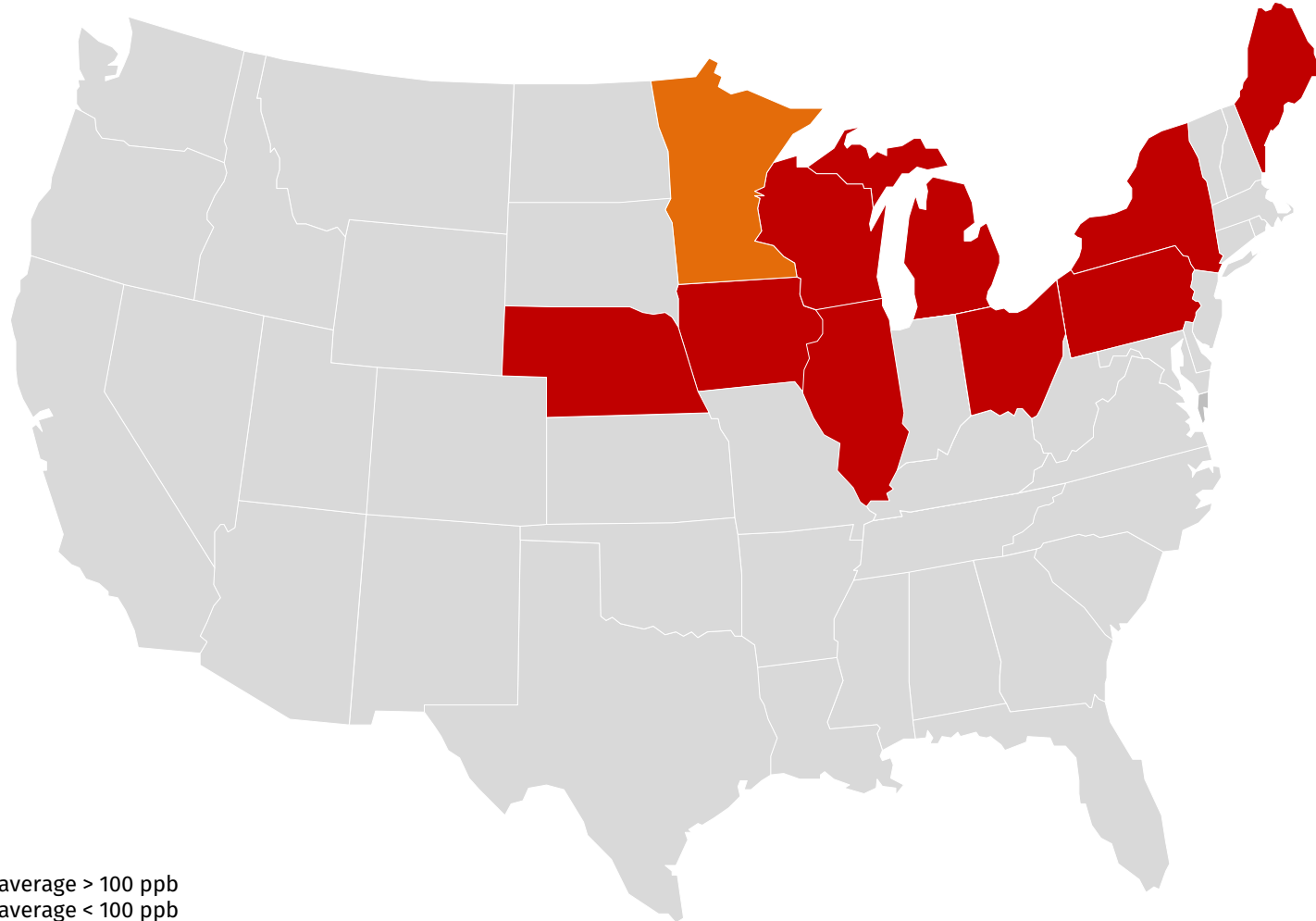


| State | Number of Samples | % Positive Samples | Avg of Positive Samples |
|-------|-------------------|--------------------|-------------------------|
| PA | 2 | 100% | 4600 |
| NE | 3 | 100% | 2567 |
| MI | 3 | 100% | 1167 |
| OH | 4 | 100% | 1050 |
| WI | 22 | 100% | 723 |
| IL | 12 | 100% | 683 |
| IA | 24 | 100% | 488 |
| MN | 2 | 100% | 300 |
| NY | 2 | 100% | 250 |
| ME | 1 | 100% | 100 |

- State with average > 2,000 ppb
- State with average < 2,000 ppb
- State with samples < LOD (100 ppb)
- No sample submitted



2021 Corn By-Products Risk by State – ZEN



| State | Number of Samples | % Positive Samples | Avg of Positive Samples |
|-------|-------------------|--------------------|-------------------------|
| NY | 2 | 100% | 1766 |
| PA | 2 | 100% | 1496 |
| MI | 3 | 100% | 367 |
| WI | 22 | 91% | 310 |
| OH | 4 | 100% | 230 |
| NE | 3 | 100% | 175 |
| IL | 12 | 92% | 119 |
| ME | 1 | 100% | 110 |
| IA | 24 | 75% | 107 |
| MN | 2 | 100% | 90 |

- State with average > 100 ppb
- State with average < 100 ppb
- State with samples < LOD (51.7 ppb)
- No sample submitted



Mycotoxin Survey Summary – 2021 US Corn By-Products



100% positive vs.
99% in 2020



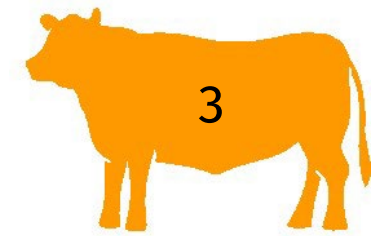
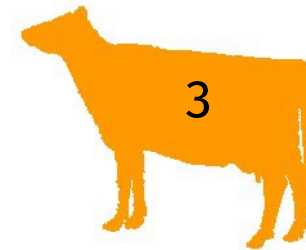
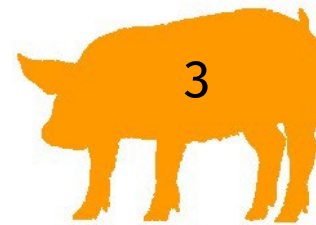
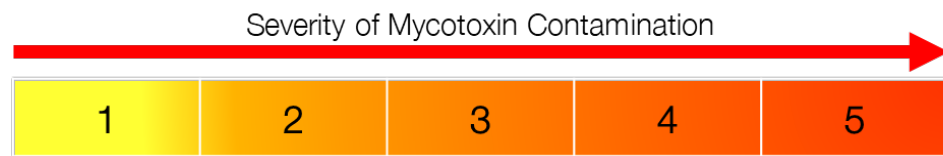
100% >1 MTX vs.
98% in 2020

B-Trich: 100% vs. 99%

FUM: 100% vs. 98%

ZEN: 88% vs. 85%

Forecasted potential risk for livestock production*:



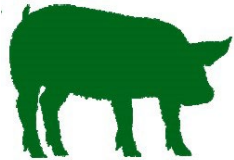
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