

Assessing Biological Risk for Yield Impact

At Pattern Ag, we focus on characterizing the agronomic impact of each biological analytic we measure. To do this, we bucket each sample and field into a low, moderate, or high level of risk for each analytic. We have two ways that we generate these levels of risk:

- Direct yield impact
- Regional benchmarking

Direct Yield Impact

For certain analytics, we can establish a direct yield impact associated with analytic levels in the soil. We do this today for four of our most impactful pathogens, including:

Analytic	Direct Yield Measurement
Corn Rootworm	Pattern measures eggs and ties egg pressure to root feeding. Root feeding has known levels of yield impact in corn. Pattern also distinguishes between NCRW and WCRW to ID extended diapause.
Soybean Cyst Nematode	Pattern measures eggs and egg pressure can be used to estimate yield impact in soybeans.
Sudden Death Syndrome	Pattern has run direct field trials to estimate the likelihood of disease expression and yield loss at different levels of inoculum load.
Root Knot Nematode	Pattern measures eggs and egg pressure can be used to estimate yield impact in soybeans.

Regional Benchmarking

We use regional benchmarking for our other biological measures to establish risk ratings. This means ***we use our vast database with millions of acres and a half decade of field experience to estimate whether a given sample is high or low in pressure*** relative to peer fields. We bucket risk ratings as follows:

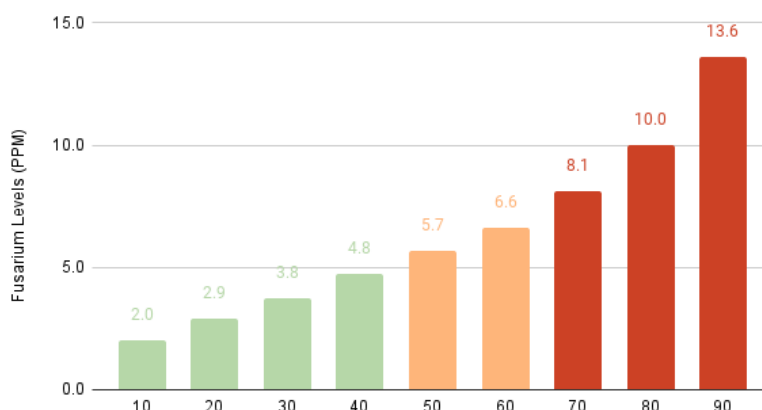
High Risk: Top 30% of fields/samples observed.

Moderate Risk: Risk that falls under the top 30% but above the bottom 50% of observed fields/samples.

Low Risk: Bottom 50% of observed fields/samples.

We started with this approach because we could see clear separation in inoculum loads in low-risk vs. high-risk fields. This example with Fusarium shows that **fields in the 90th percentile have ~7X the pressure of 10th percentile fields:**

Distribution of Fusarium Levels By Decile (IL - PPM)



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Over the years, we have found that our benchmarking approach strongly correlates with yield outcomes in the field. For example, in our 2023 trial program, we were able to show that fields high in Fusarium pressure had a 50+ bu/ac yield drag when compared to fields with low fusarium pressure, and these relationships were demonstrated across the midwest for a wide range of pathogens that we benchmark in this way:

