The Economics of Bt Corn in Wisconsin

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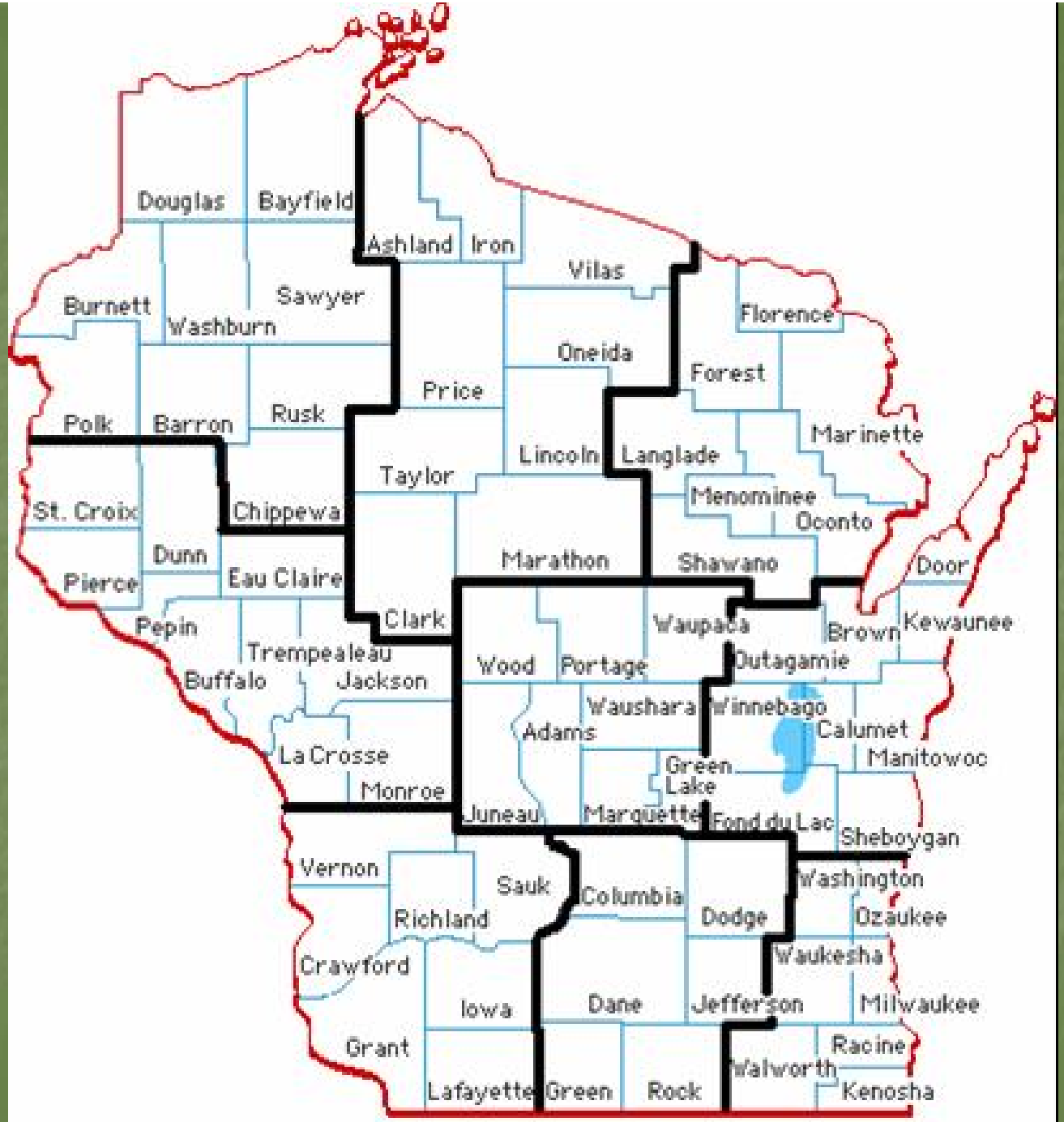
Overview

Used DATCP European corn borer population survey data and my published research to estimate the net benefit ($/ac) of Bt corn in each Wisconsin Crop Reporting District

DATCP ECB data

- DATCP annual fall survey of 2nd generation ECB populations in corn fields
- Several fields in several counties
- Average for each Crop Reporting District (CRD) for 1957-2004
- Tested and found no autocorrelation
- Estimated mean and CV of average ECB population per plant in each CRD



Damage from ECB

- Used Mitchell et al. 2002 to estimate distribution of stalk tunneling as function of ECB population distribution
- Used Hurley, Mitchell, and Rice 2004 to estimate distribution of % yield loss as function of stalk tunneling distribution
- Final Result: distribution of % Yield Loss from ECB for each CRD

Economics

- Used USDA-NASS 5-year average yields for each CRD for mean, assume 30% CV
- Used corn price of $2.00/bu
- Used technology fee of $18/bag=$7.43/ac (80,000 seed/bag 33,000 seeds/ac)
- 20% of field planted as non-Bt (conventional) corn for refuge

Net Benefit

- Returns with Bt corn

  0.8 x (price x yield – TechFee – COP) +

  0.2 x (price x yield x (1–%loss) – COP)

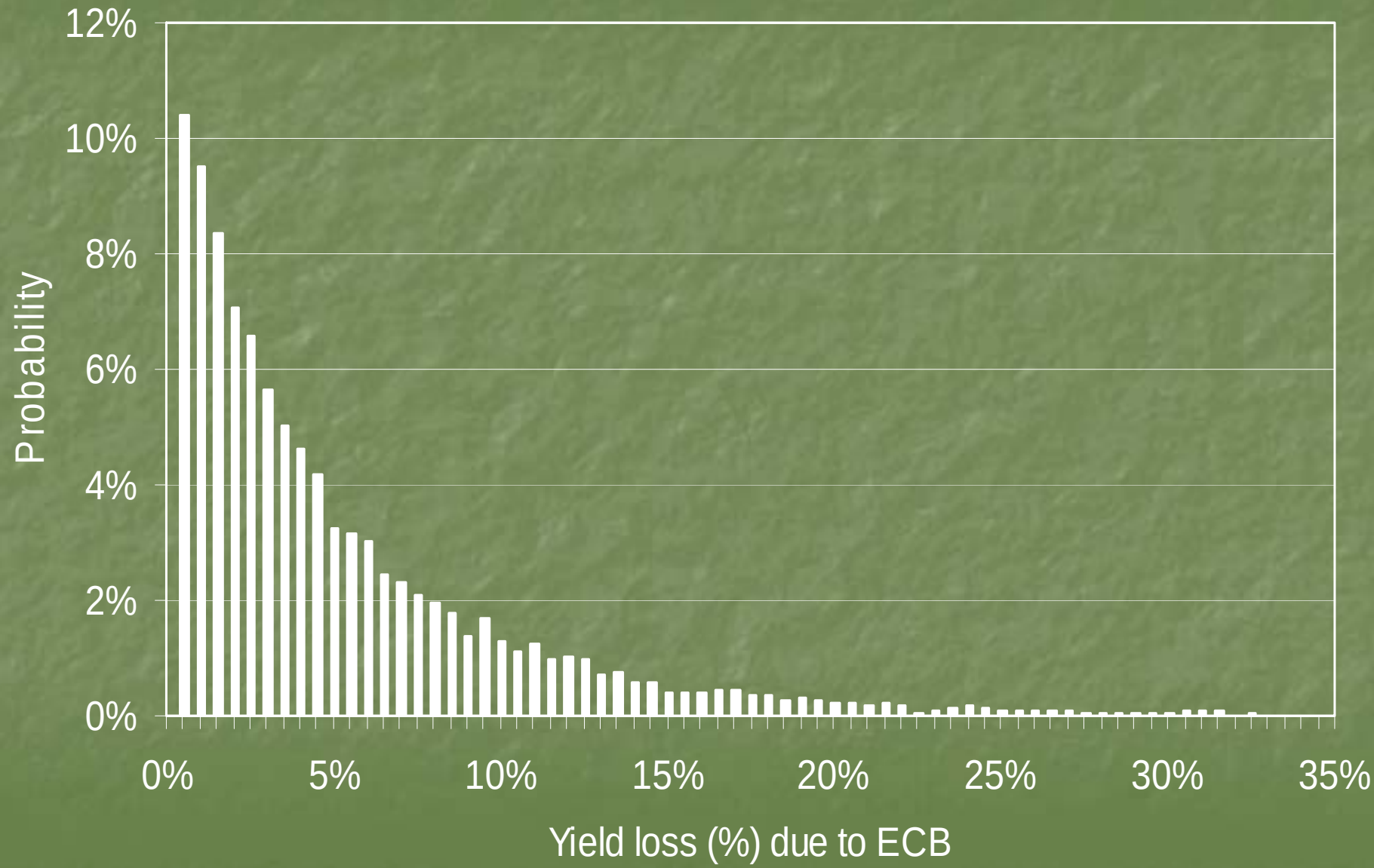
- Returns with all conventional corn

  price x yield x (1–%loss) – COP

- Net Benefit = Returns with Bt corn – Returns with all conventional corn

District	Mean ECB	CV ECB	Yield Loss	5-Year Avg Yield	Avg Net Benefit	Probability Benefit < 0
NW	0.31	1.20	4.04%	123.8	2.06	57.6%
NC	0.17	1.05	3.46%	119.2	0.66	64.1%
NE	0.25	1.14	3.83%	125.6	1.76	59.1%
WC	0.60	1.48	4.75%	132.8	4.15	50.0%
CN	0.58	1.52	4.69%	125.0	3.44	52.4%
EC	0.29	0.97	4.09%	135.4	2.92	54.0%
SW	0.79	1.30	5.21%	141.8	5.86	44.2%
SC	0.70	1.31	5.04%	139.2	5.27	45.9%
SE	0.68	1.82	4.75%	123.4	3.44	52.7%
State	0.49	0.87	4.80%	133.2	4.28	48.4%

ECB yield loss distribution in South Central Wisconsin



Summary/Implications

- On average, Bt corn should generate a positive net benefit for most Wisconsin farmers
- Distribution of losses is highly skewed so that in most years, Wisconsin farmers should lose money with Bt corn
- Intuition: Most years ECB are not a severe problem, so losses do not cover the tech fee, but when ECB are bad, losses far exceed the tech fee so Bt corn well worth the cost.
- What's missing: Lodging losses, which increase the value of Bt corn