

Measurements and Modeling of Atmospheric Gene flow from GR Horseweed (*Conyza canadensis*)

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Haiyan Huang¹, Rongjian Ye², Yanhui Peng², Neal Stewart, Jr.², David DuBois³, Junming Wang^{1*}

¹ Illinois State Water Survey, Prairie Research Institute, University of Illinois at Urbana-Champaign, ² University of Tennessee, ³ New Mexico State University, wangjim@illinois.edu, 217-300-2529

Introduction

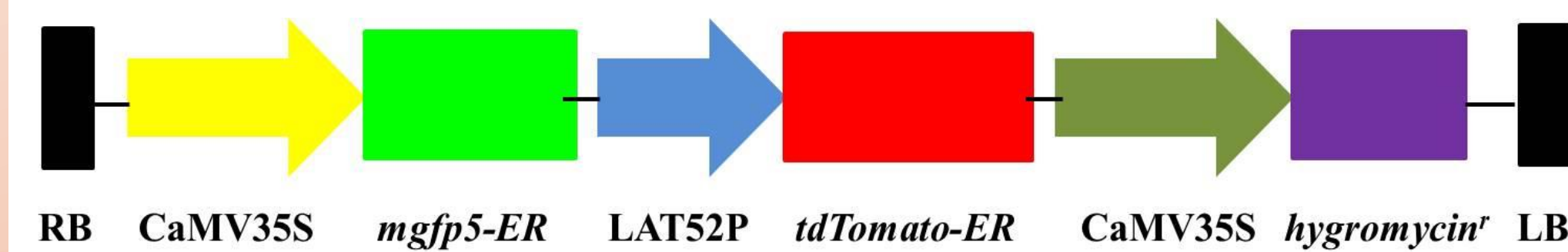
- Horseweed is a problematic weed:
- Native in north/central America.
- Wide spread Glyphosate-Resistant (GR) biotype (16 US states).
- No-till systems (cotton, corn, soybean).
- Prolific seed producer (at the order of ~100,000 seeds /plant).
- Light-weighted seeds/pollen, wind disposal.



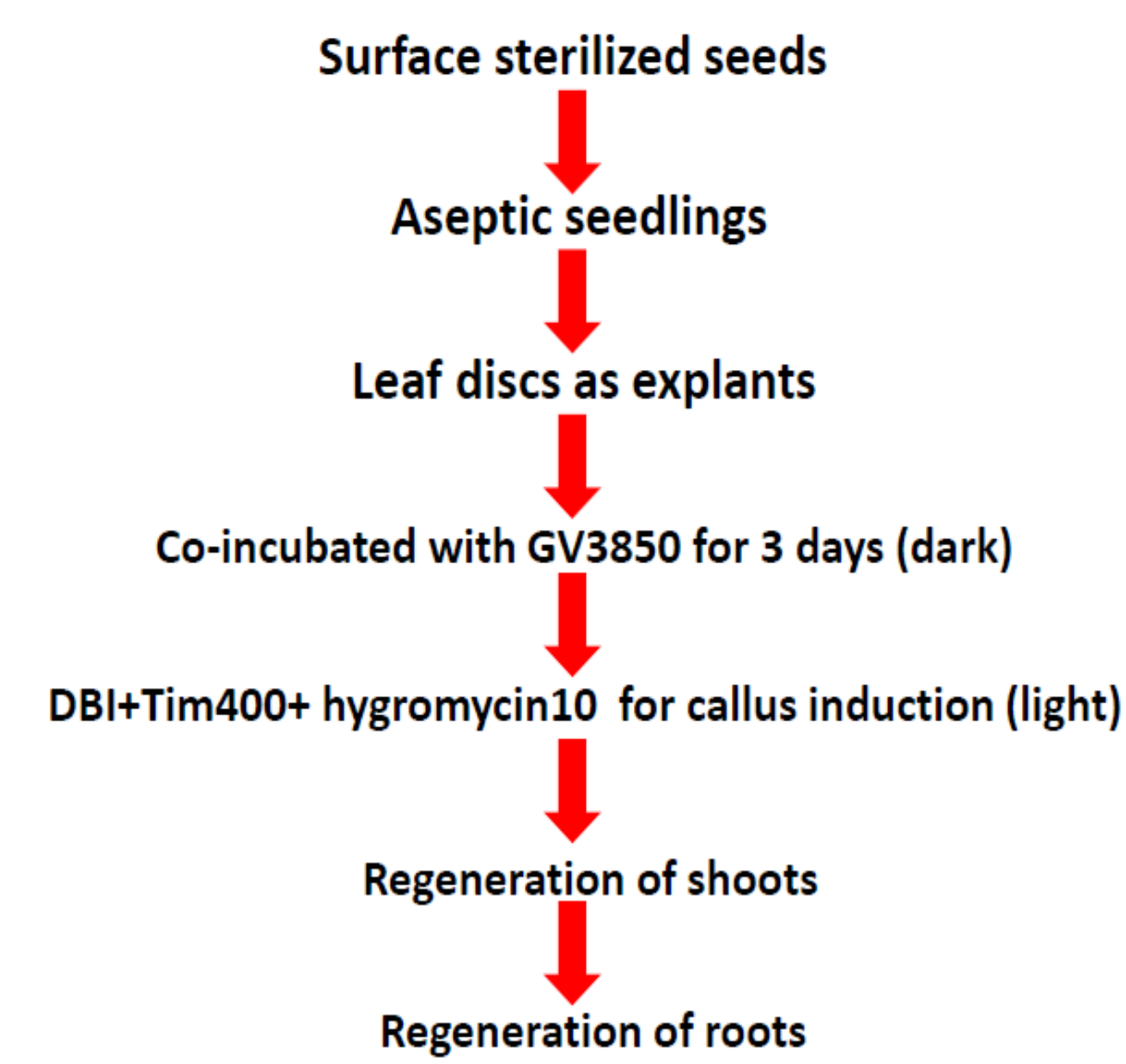
Horseweed in UIUC, 2013



GFP Horseweed Making: TNR horseweed (glyphosate resistance horseweed from Tennessee)



Agrobacterium-mediated transformation



Halfhill et al. 2007 *Plant Cell Rep.* 26:303-311

Field Experiment design

Four sites in UIUC (Aug – Oct 2013), one site in University of Tennessee (May 2013 – Oct 2013)

Instrument: Rotorod sampler



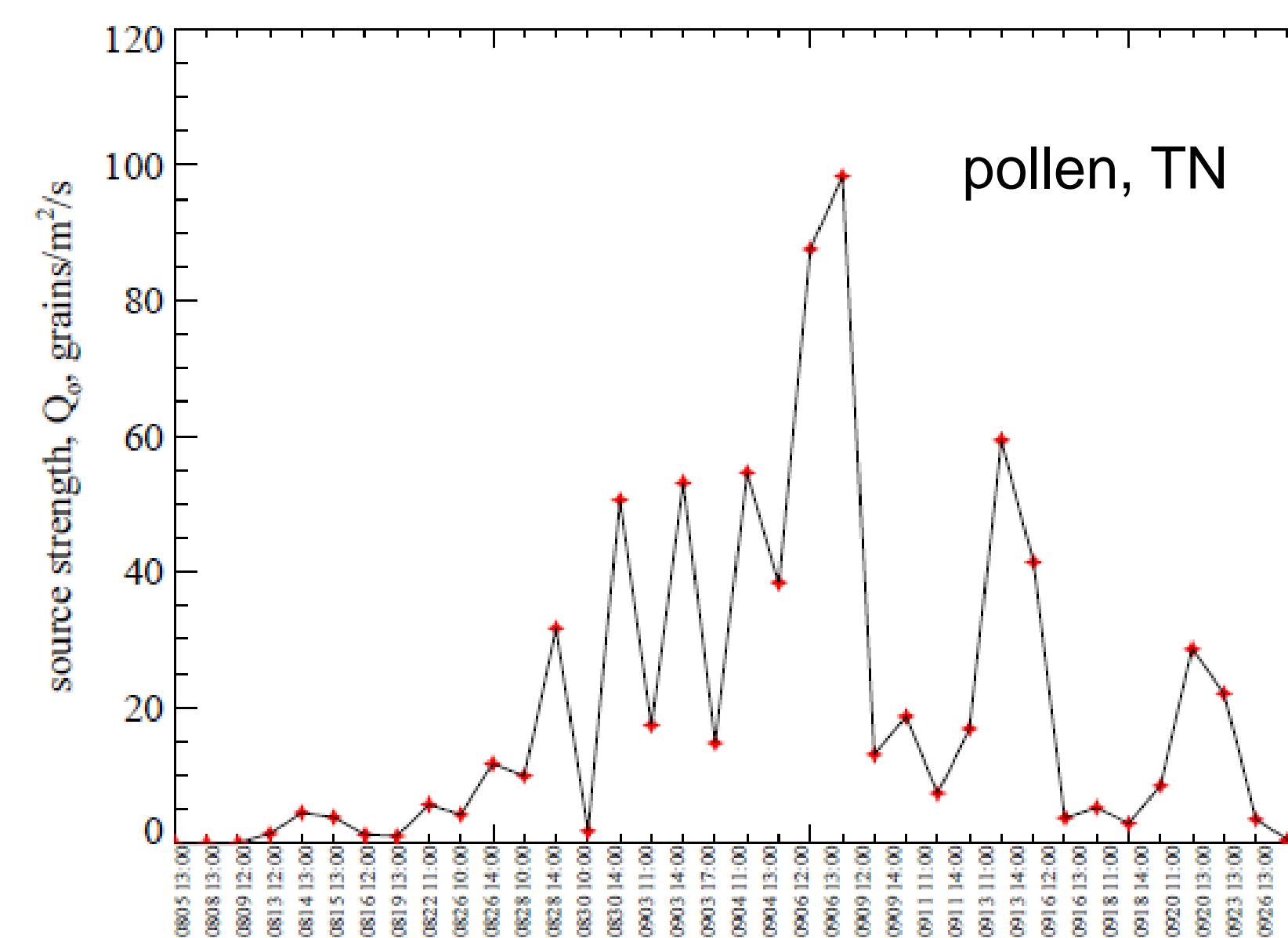
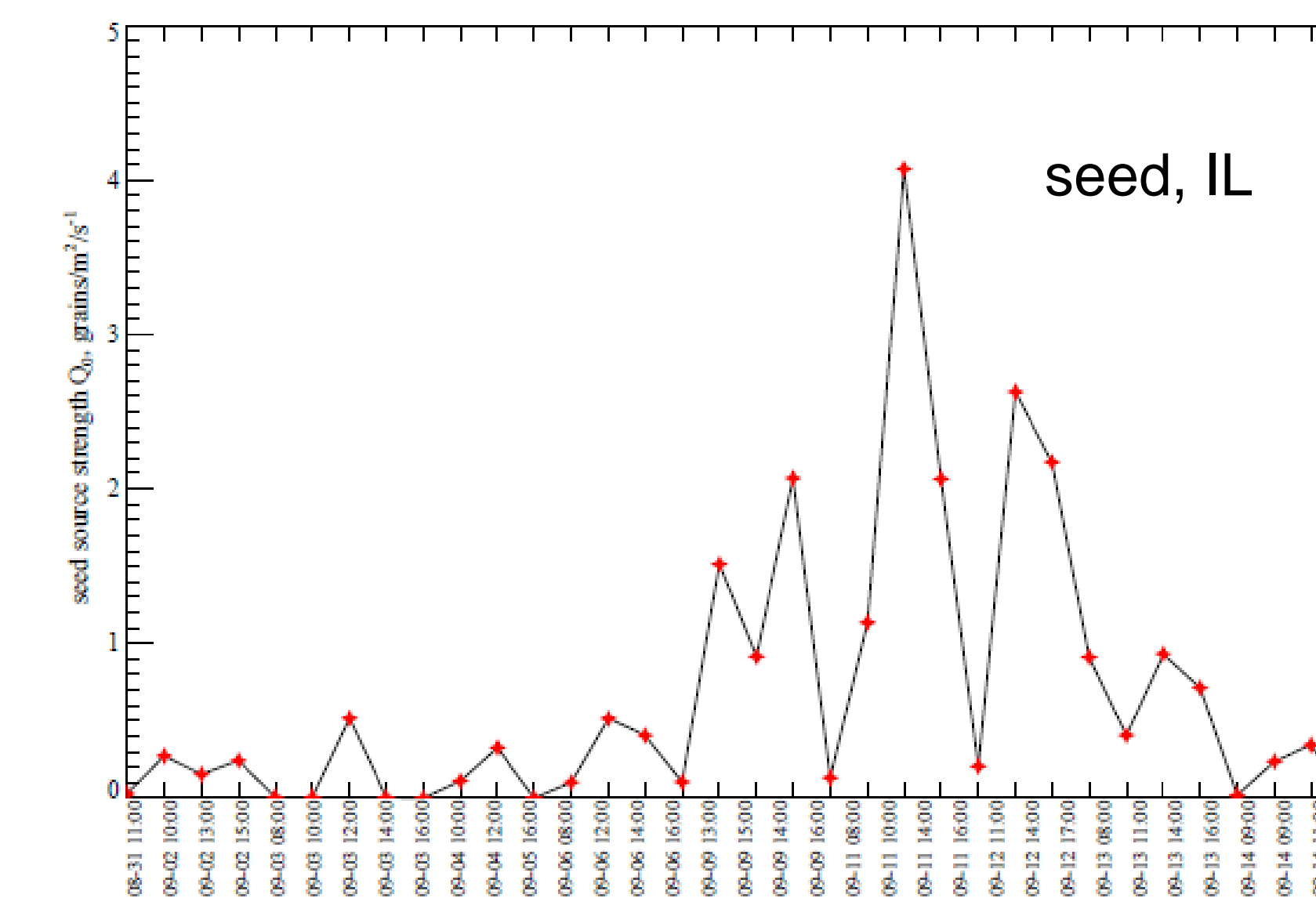
“Mystery balloons floating above city”

<http://www.illinoishomepage.net/story/mystery-balloons-floating-above-city/d/story/YrvhXFr80CIDbQaTRn7kw>

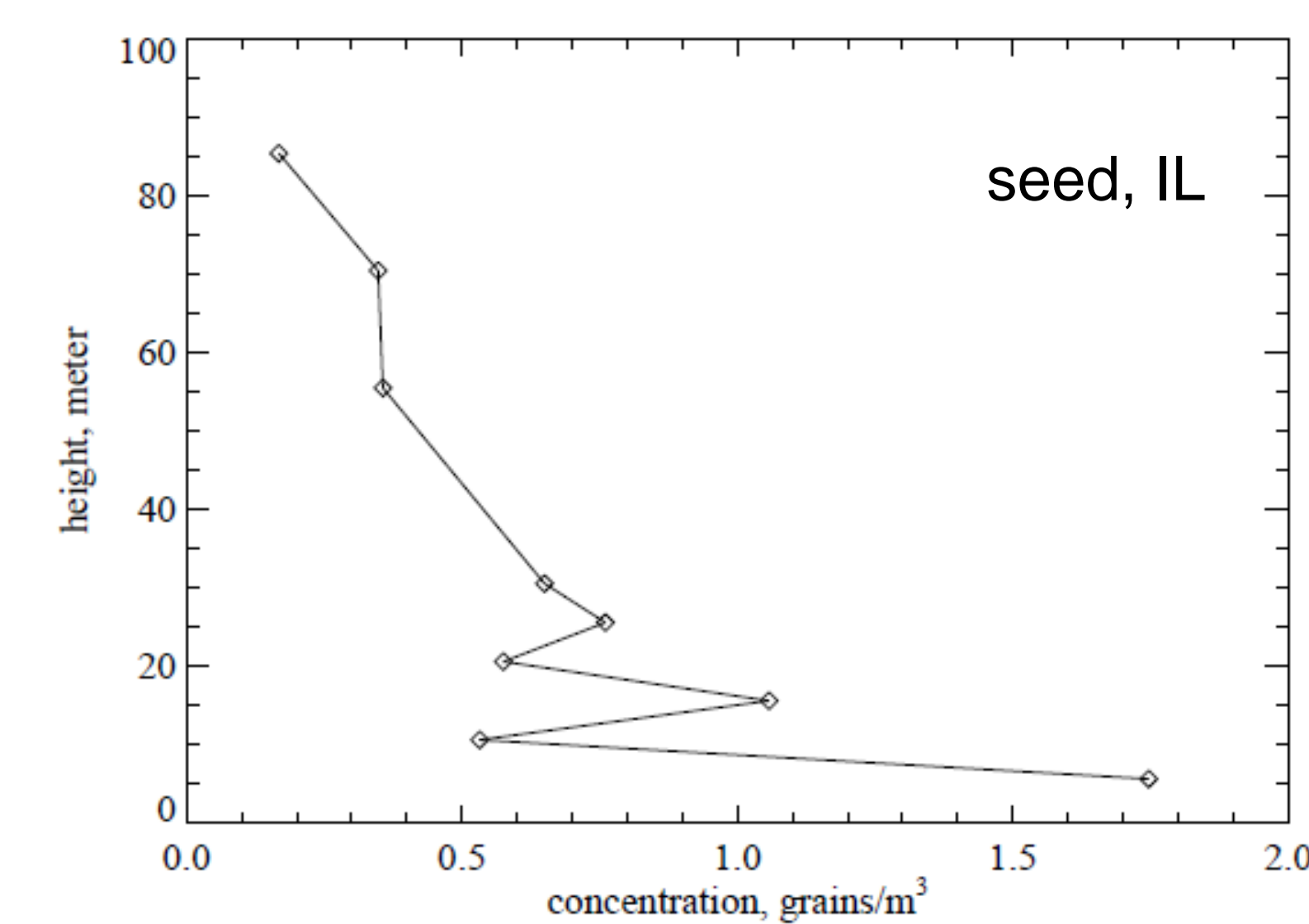
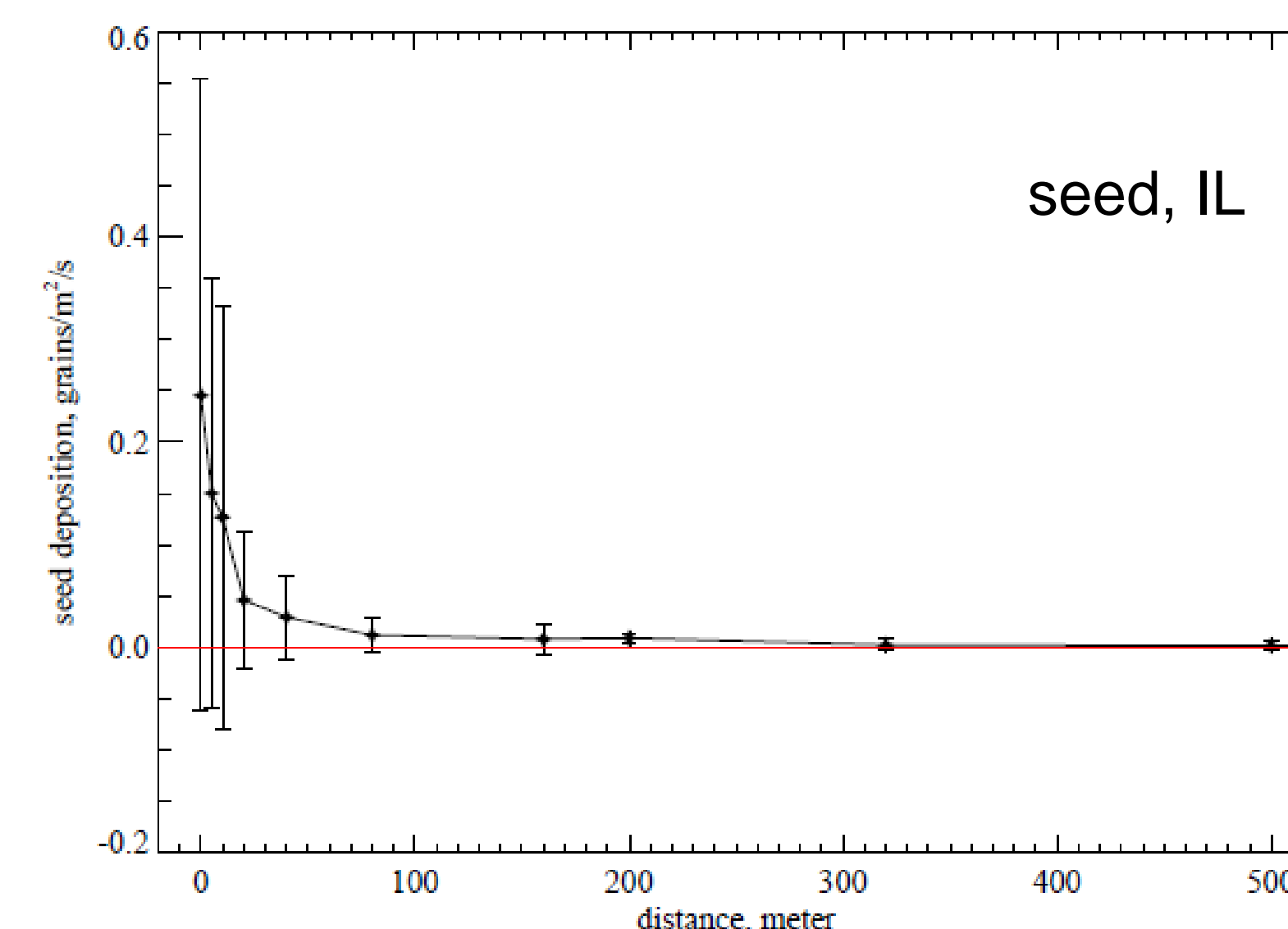
Results

Source strength (release rate)

$$Q_0 = \underbrace{\int_0^R \frac{D(r)}{R} dr}_a + \underbrace{\int_0^\infty \frac{u(z)C(0,z)}{R} dz}_b$$



Horizontal and vertical distributions



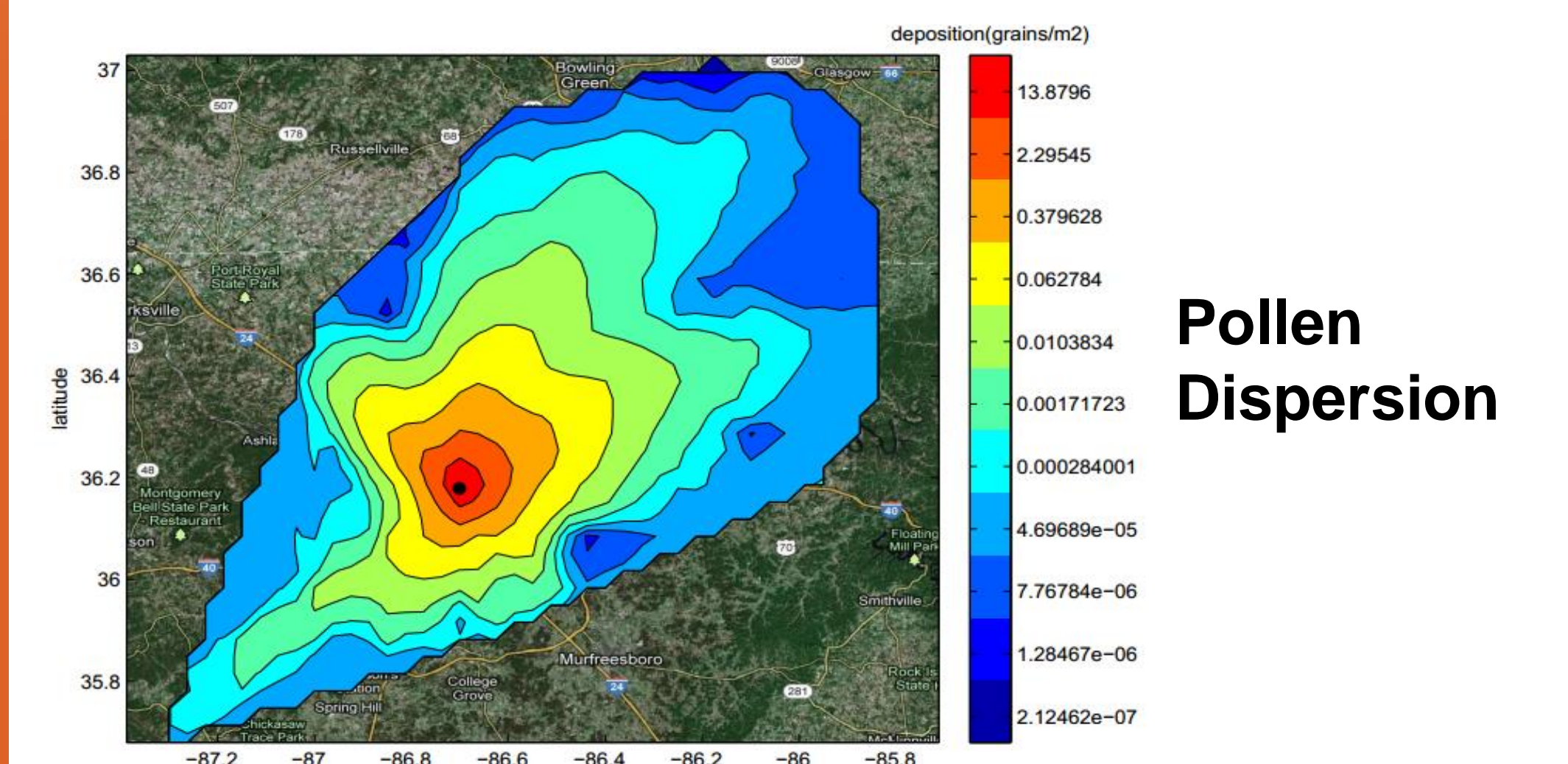
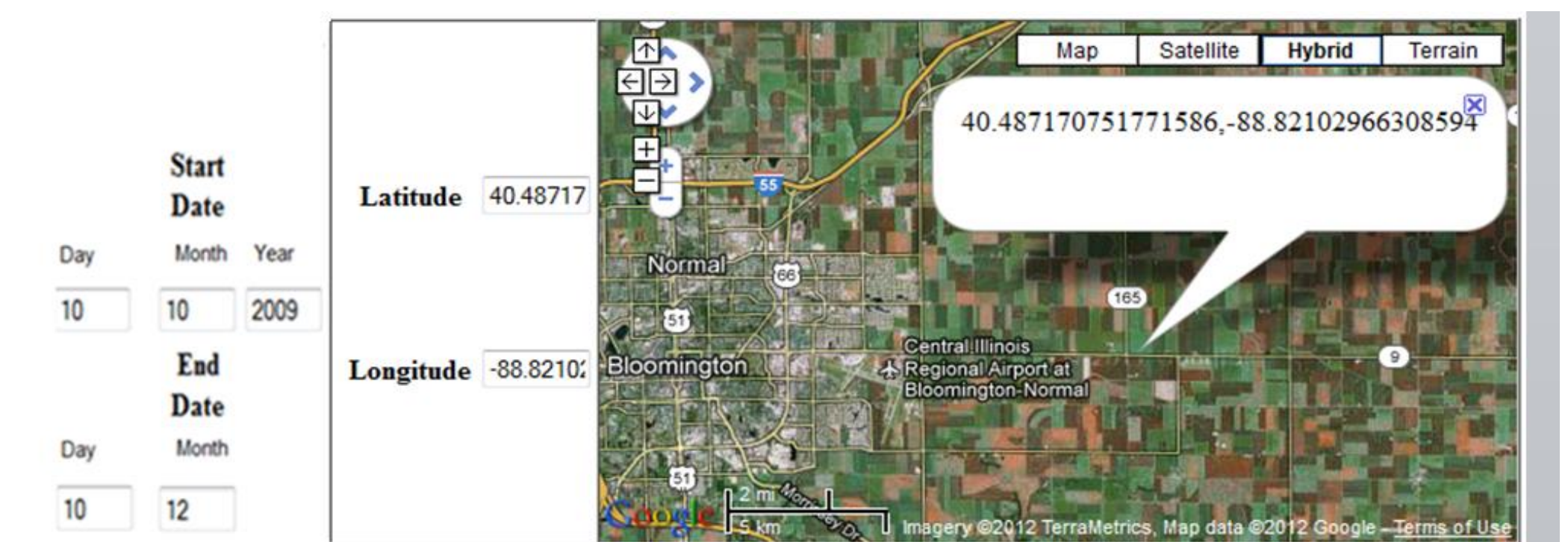
Concluding remarks

Substantial seed/pollen release were observed. Most of the seeds released were deposited within about 300m, while pollen could travel longer. Seeds/pollen could reach the height above surface layer (>80 m).

Ongoing work

Gene-Flow Online Tool: to predict plant seeds/pollen dispersal and outcrossing.

<http://rsetserver.sws.uiuc.edu/horseweed/>



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