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Study examines effects of ozone, glyphosate on California horseweed

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Higher ozone levels in California's San Joaquin Valley may be benefiting horseweed populations that are resistant to a popular herbicide.

The area is exposed to regular use of glyphosate, a common herbicide, and high ozone levels, according to an article in the newest issue of *Weed Science*. Glyphosate-resistant horseweed was first identified in California in 2005 and has become dominant in the eastern San Joaquin Valley.

"The agroecosystems of the San Joaquin Valley are exposed concurrently to at least two recent anthropogenic stressors at high levels," write D. A. Grantz, A. Shrestha, and H-B. Vu in their article.

In the article, they examine results of their study of the rapid spread of horseweed and the effects of increasing glyphosate use and levels of ozone, the most damaging air pollutant. "Coevolution of resistance to these two factors could explain the recent explosion of horseweed and the shift toward a resistance-dominated population," according to the authors.

The study did not support their primary hypotheses that the glyphosate-resistant and glyphosate-sensitive biotypes both thrive under baseline conditions, nor that the recent evolution of the glyphosate-resistant biotype is associated with evolving resistance to ozone.

"It remains unclear what factors have led to the rapid increase of horseweed populations in the San Joaquin Valley," the authors say.

Without glyphosate use, both types of horseweed remain viable, even at the highest ozone levels. But the study found that the use of glyphosate amid high ozone levels has the potential to eliminate glyphosate-sensitive horseweed, which may contribute to the recent spread of glyphosate-resistant horseweed and affect the relationship between the two horseweed biotypes. This is a previously unrecognized effect of ozone on unmanaged plant populations, according to the authors.

The article is "Ozone Enhances Adaptive Benefit of Glyphosate Resistance in Horseweed" by D. A. Grantz, A. Shrestha, and H-B. Vu. The article appears in *Weed Science*, Volume 56, Issue 4, 2008, published by Allen Press Inc.

Full text of the article is available at <http://www.allenpress.com/pdf/WEES-56-4-549.pdf>.

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