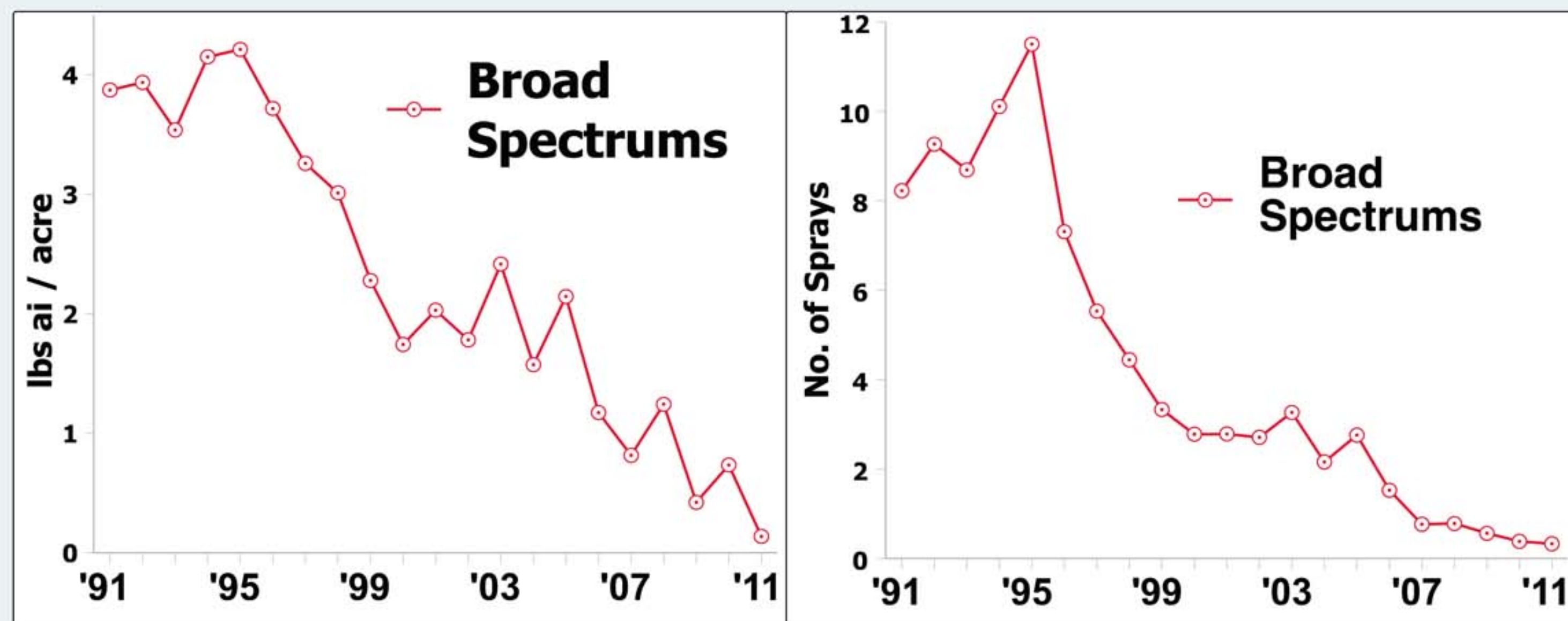


COTTON BROAD SPECTRUM



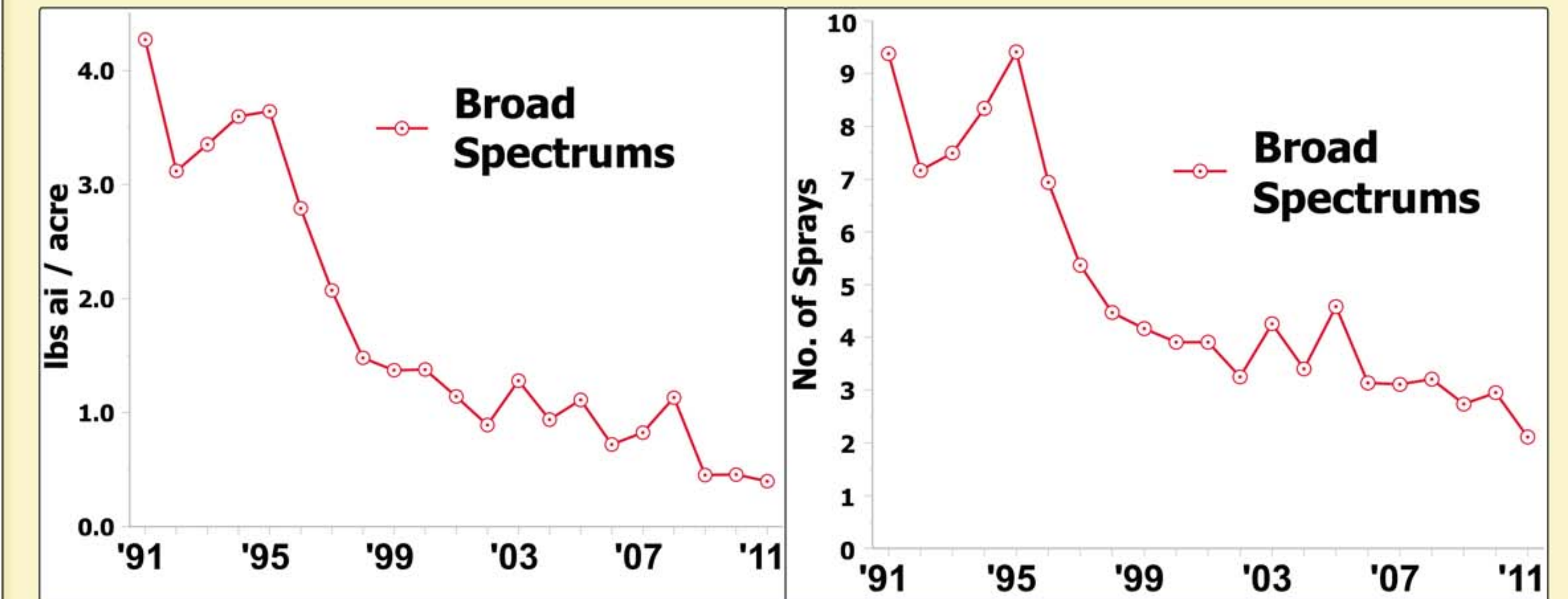
Cotton broad-spectrum insecticides have been reduced from a high of ca. 12 sprays (> 4 lbs ai) per acre (1995) to a fraction of a spray (< 1 lb ai) per acre. Declines occurred after 1996 following introduction of Bt cotton, whitefly IGRs and dissemination of a new IPM plan. Declines since 2006 are attributed to a pink bollworm eradication program and a new reduced-risk Lygus feeding inhibitor (flonicamid), which conserves natural enemies.

OVERVIEW

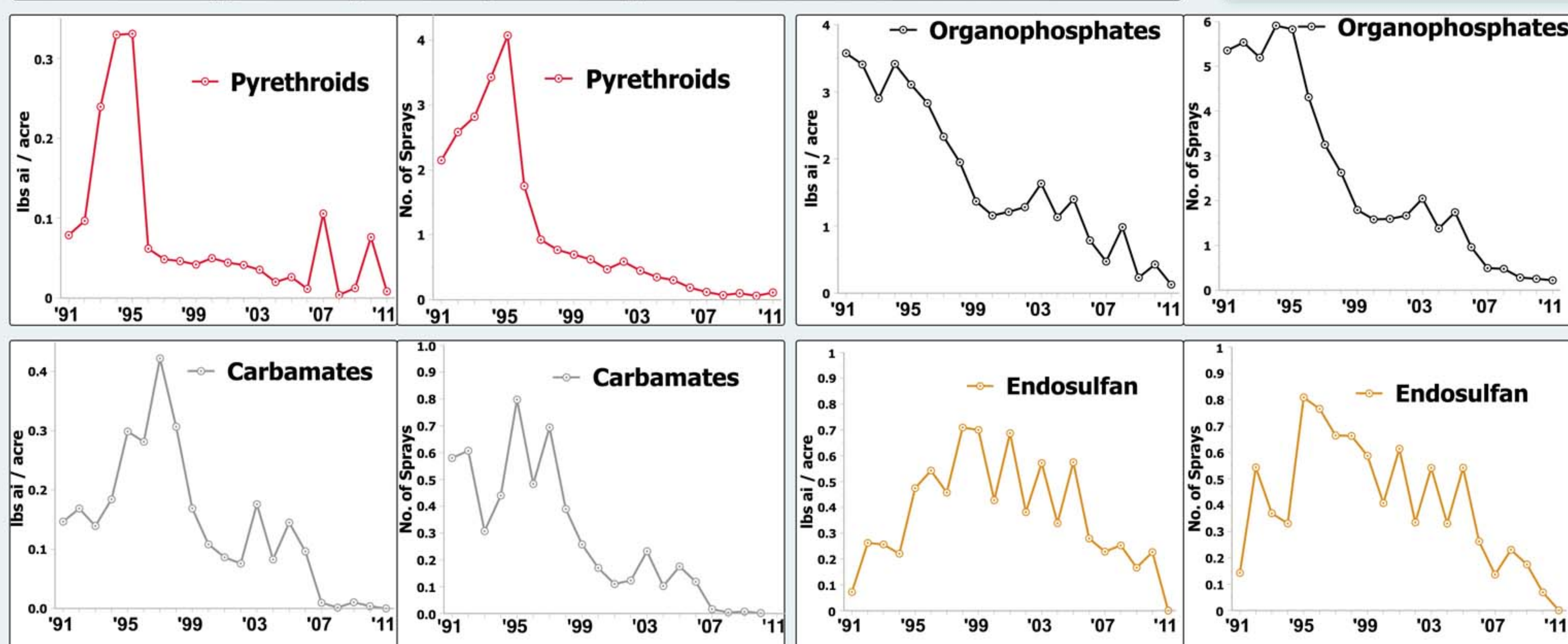
IPM programs seek to optimize pesticide use as a part of a broader strategy to manage pests while minimizing risk to non-target organisms, people and the environment. In many systems for insect management, this optimization may lead to a reduction in overall pesticide use and / or a shift from broad-spectrum compounds to more targeted reduced-risk chemistries. Long-term changes in pesticide use patterns provide one barometer to examine progress in IPM implementation. However, it is often difficult to assess changes in pesticide use due to a lack of available data. The Arizona Pest Management Center (APMC) has invested significant resources into IPM assessment. This includes user surveys conducted as part of the Crop Pest Losses and Impact Assessment Work Group (see poster #P051) and development of the APMC Pesticide Use Database (present poster), which contains 22 years of state pesticide use reports for agricultural crops.

We analyzed insecticide use data for Arizona cotton and lettuce and charted 22-year use trends for major chemistries. Overall results show a dramatic reduction in the use of broad-spectrum insecticides and an increase in adoption and use of selective chemistries that help maintain natural enemy populations and reduce risk to human health and the environment.

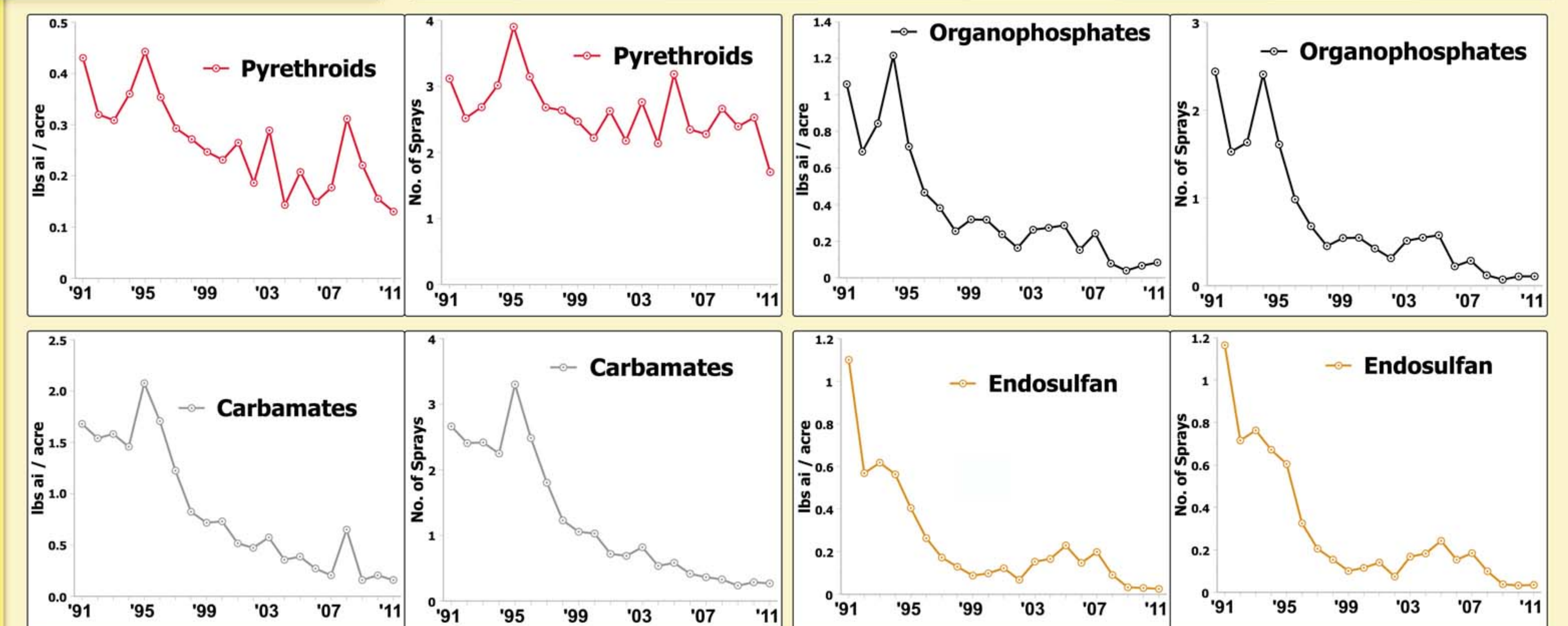
LETTUCE BROAD SPECTRUM



Broad spectrum insecticides on lettuce have been reduced from a high of 9 sprays (> 4 lbs ai) per acre to just over 2 sprays (< 1 lb ai) per acre in 2011.

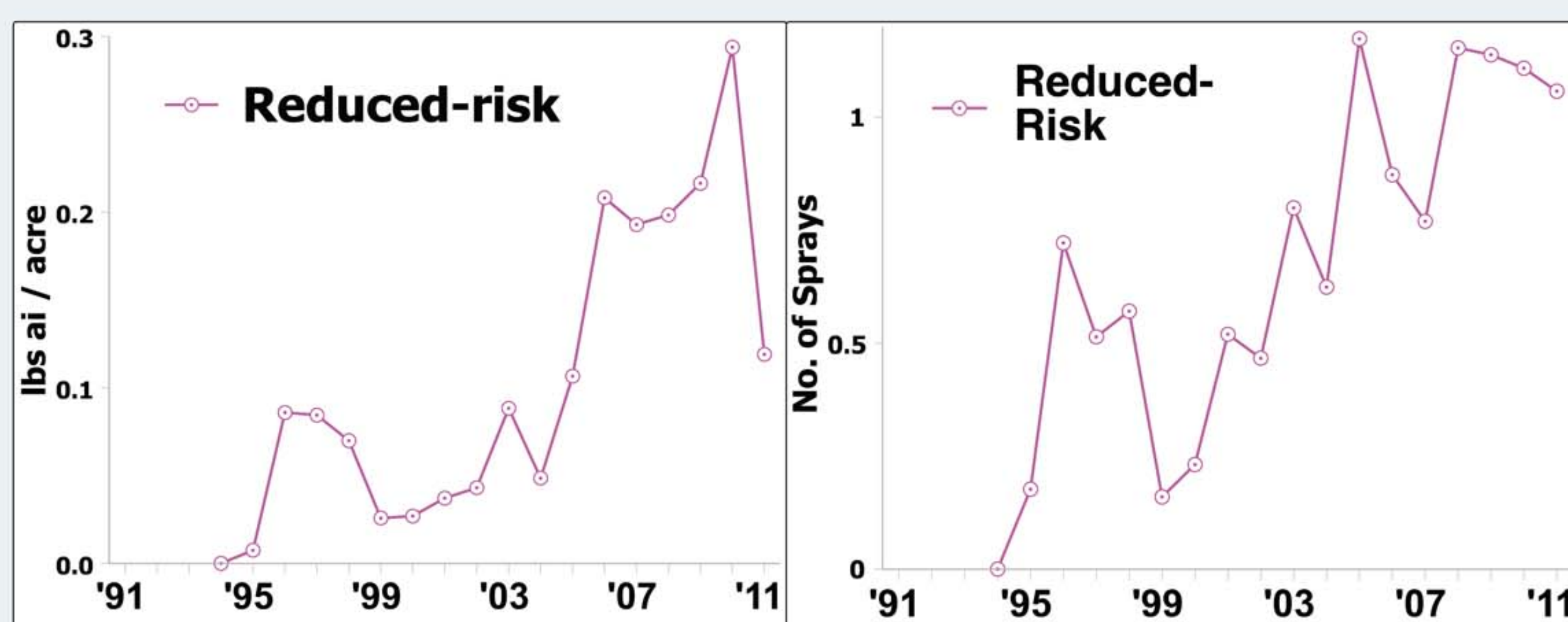


Broad-spectrum insecticides, carbamates, organophosphates (OPs), pyrethroids and endosulfan (an organochlorine) have shown dramatic declines in both sprays per acre and pounds active ingredient per acre.



Carbamates, OPs & endosulfan have been reduced to a fraction of a spray per acre. Pyrethroids, which are important for control of aphids, whiteflies, Bagrada (invasive stink bug) & lepidopterans, have been reduced to a much lesser extent.

COTTON TRANSITION TO REDUCED RISK CHEMISTRIES



Adoption and use of reduced-risk chemistries for insect management in cotton have increased since the introduction of the first products in 1996. Many products in this category also preserve natural enemies of key pests in the cotton system, reducing the need for follow-up sprays.

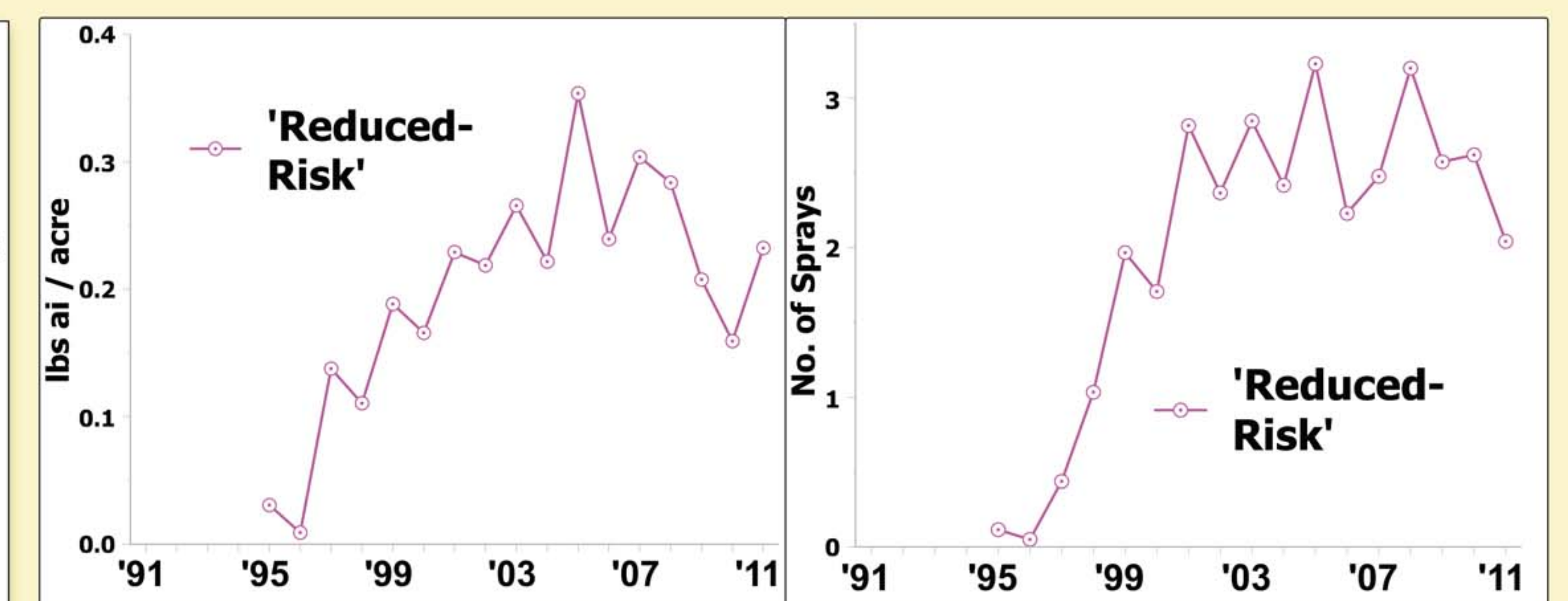
CONSTRAINTS

The APMC Pesticide Use Database contains all reported statewide agricultural pesticide uses 1991–2011. Reporting is required for all custom (for hire) and aerial applications, Section 18 exemptions, and products listed on Arizona Department of Environmental Quality's Groundwater Protection List. Our database does not provide a complete picture of use for all pesticides. However, many types of insecticides are typically custom applied and are well represented in the data. Furthermore, the same types of applications have been reported across all years, so this dataset provides a valid resource for examining long-term trends.

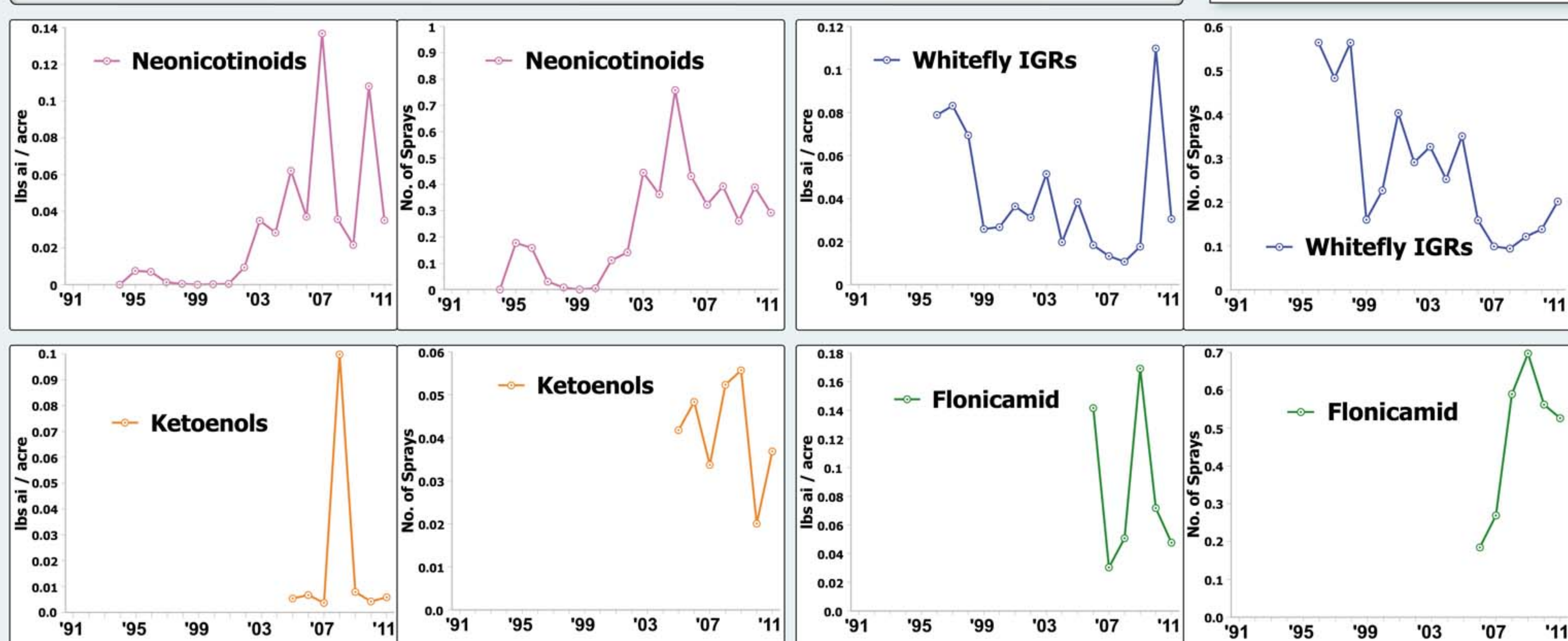
ACKNOWLEDGMENTS

The Arizona Department of Agriculture (ADA), Environmental Services Division was our partner in developing the database. Thanks to Jack Peterson, Gary Christian and David Hall. We gratefully acknowledge support from the ADA Specialty Crops Block Grant Program, Western IPM Center, USDA Western Region IPM Program, USDA Risk Avoidance and Mitigation Program, the University of Arizona Maricopa Agricultural Center, and the Federal Extension IPM Program.

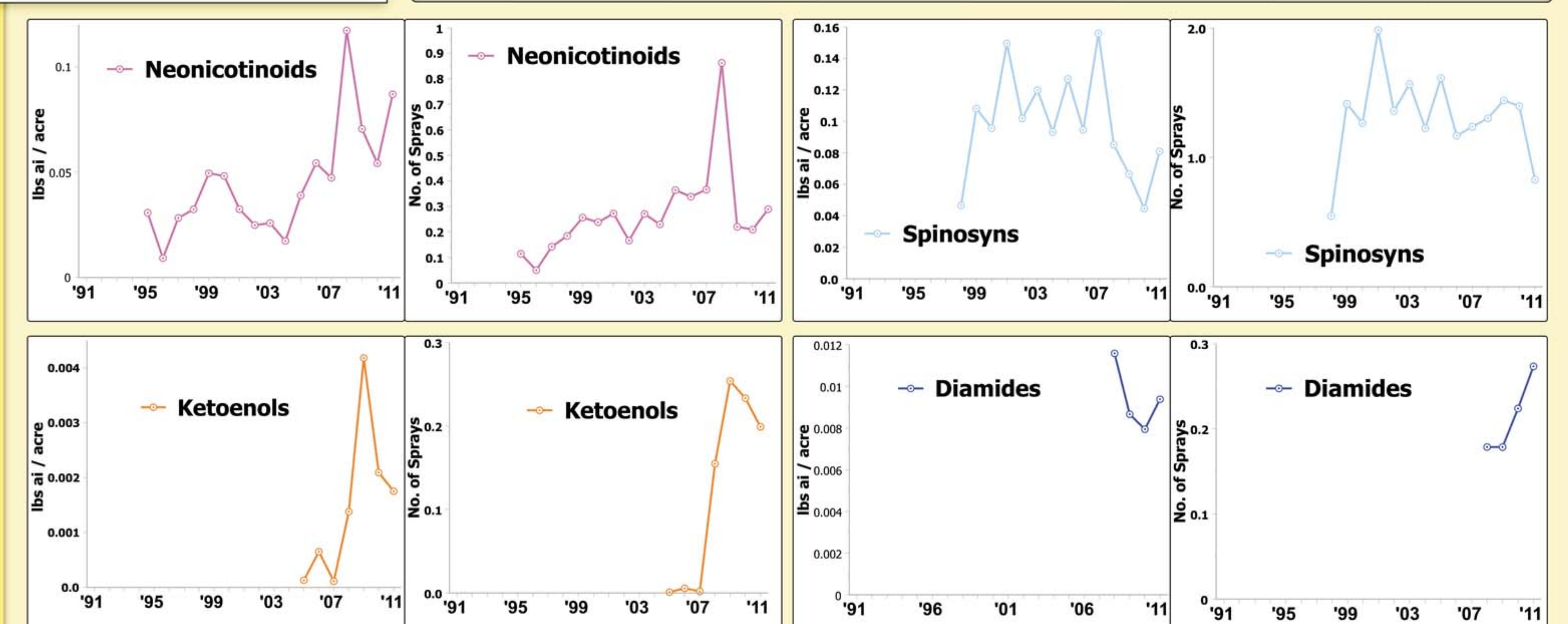
LETTUCE TRANSITION TO REDUCED RISK CHEMISTRIES



The use of reduced-risk insecticides in lettuce has increased since the introduction of the first products in 1996. Availability of novel and multiple chemistries help producers reduce the risk of insecticide resistance.



These reduced-risk chemistries are now important tools in cotton IPM. Whitefly IGRs (pyriproxyfen & buprofezin) are selective against whitefly nymphs. Neonicotinoids are partially selective against whiteflies. The ketoenol class (only spiromesifen in cotton) is used for whitefly management. Flonicamid is a feeding inhibitor selective against Lygus bug.



Imidacloprid played a critical role in recovery of fall lettuce following invasive whitefly outbreaks (mid 90s) and, with other neonicotinoids, remains important against aphids & whiteflies. The ketoenols include spiromesifen, used for whitefly control, and spirotriamat, used against whiteflies and aphids. Diamides help control lepidopterans and spinosyns a variety of pests.