Notes for 2020 KBS ladybeetle analysis

Each of these panels presents raw capture data of ladybeetles for a given treatment by rep combination, summed over the year. The super-imposed GAM model uses year as an independent variable smoothed using thin plate regression splines and number of traps (i.e. sampling effort) as an offset variable. To minimize overfitting, each GAM regression was limited to the number of unique years of observation divided by 5 and rounded to the nearest integer (in most cases, 6, except for species that were not monitored in all years) and a smoothing parameter of 0.5. The models used a quasipoisson variance structure as this type was found to give the best general fit across species. The predictions of the GAM model are projected into the scale of the original sampling, using 50 traps per year as an average sampling effort. A 95% confidence interval is given around the GAM model fit line. Panels for native species are given with pale blue shading, and those for invasive species are given in orange, and all species together are shaded in grey.

In most cases, the data was variable but found year was a significant predictor, suggesting a temporal dependency in all but 3 species. The effective degrees of freedom (edf) is a measure of the ‘wiggliness’ (technical term) of the fit which is roughly analogous to order of polynomial- where 1= a linear fit.

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| Panel | Taxa | Deviance explained % | edf | P value |
| A | ABIPN | 48.4 | 2.33 | <0.001 |
| B | BURSI | 0.3 | 1.71 | 0.672 |
| C | C7 | 18.9 | 4.92 | <0.001 |
| D | CMAC | 8.8 | 4.80 | <0.001 |
| E | CSTIG | 14.8 | 3.29 | <0.001 |
| F | CTRIF | 10.8 | 1.89 | 0.001 |
| G | CYCSP | 6.1 | 4.30 | <0.001 |
| H | H13 | 1.0 | 1.21 | 0.371 |
| I | HAXY | 26.6 | 4.80 | <0.001 |
| J | HCONV | 4.3 | 2.54 | 0.068 |
| K | HGLAC | 28.4 | 2.62 | <0.001 |
| L | HPARN | 5.4 | 4.04 | <0.001 |
| M | HVAR | 11.5 | 2.56 | <0.001 |
| N | PQUA | 4.3 | 1.95 | <0.001 |
| 2A | Native | 12.3 | 4.86 | <0.001 |
| 2B | Invasive | 12.6 | 4.95 | <0.001 |
| 2C | All species | 12.7 | 4.97 | <0.001 |

My impressions: WOW. There is a definite temporal effect going on that seems to be accelerating in the last 5-8 years, with the whole community in apparent decline during that time. Native taxa stabilized for a bit after the soybean aphid years but have largely been on a downward trend for the duration of our observations, but possibly even more remarkable is that the invasive community has been in not decline not just during the period we were getting soybean aphid under control, but since then as well.