

Managing herbicide-resistant common ragweed emergence and growth in soybean

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Herbicide-resistant common ragweed (*Ambrosia artemisiifolia* L.) in soybean is prevalent on Maryland's Lower Eastern Shore and Southern Maryland, and resistance to three herbicide families have been documented (glyphosate, ALS-herbicides, and PPO-herbicides). Early-season management of common ragweed is strongly dependent upon reducing seedling emergence and controlling ragweed populations prior to soybean planting. Therefore these studies will evaluate reducing ragweed germination and early-spring growth through the combination of delaying cover crop termination in order to increase cover crop biomass and competition with weeds, and herbicide control.



Hypotheses

- **Delaying cover crop burndown will reduce herbicide-resistant common ragweed emergence and growth**
- **Various residual herbicide products will reduce herbicide-resistant common ragweed emergence and growth**

Methods

- On-farm trials located at two sites on Lower Eastern Shore of Maryland with a history of herbicide-resistant common ragweed
- Treatments in cover crop termination/residual herbicide timing study: cover crop termination on 4 Apr, 29 Apr, or at soybean planting, with residual herbicide applied either at cover crop termination, at soybean planting, or not at all (Figure 1a)
- Treatments in residual herbicide study: cover crop termination 29 Apr, with no residual herbicide, Command (clomazone), Linex 4L (linuron), Dimetric (metribuzin), Command + Linex, Command + Dimetric, or Linex + Dimetric applied at soybean planting (Figure 1b)
- Randomized complete block design with four replications
- Measurements include common ragweed density and height every seven days following ragweed germination and soybean yield

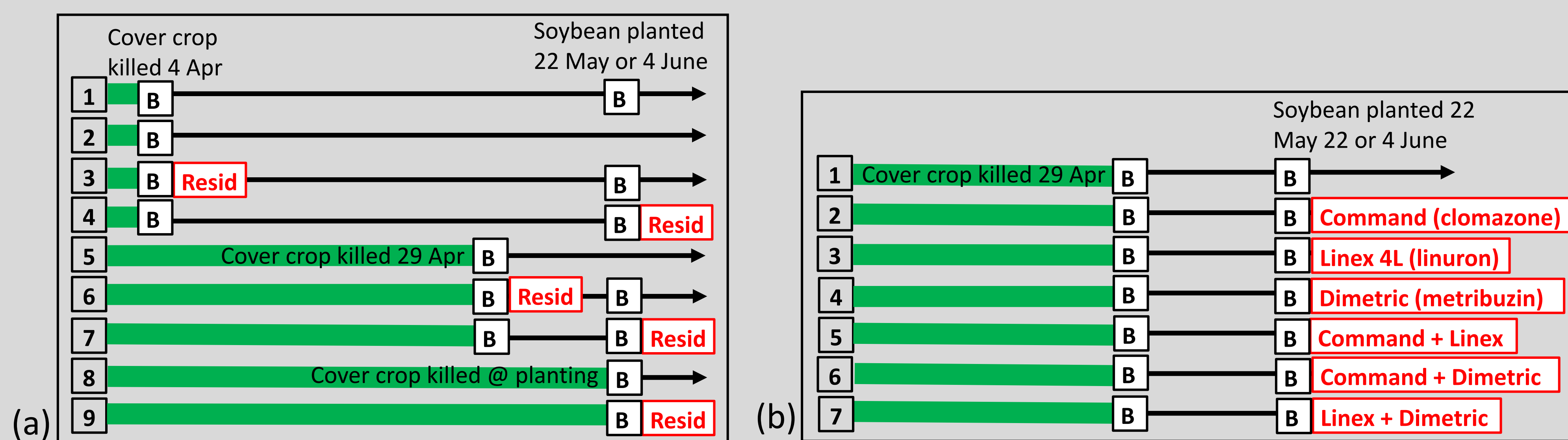
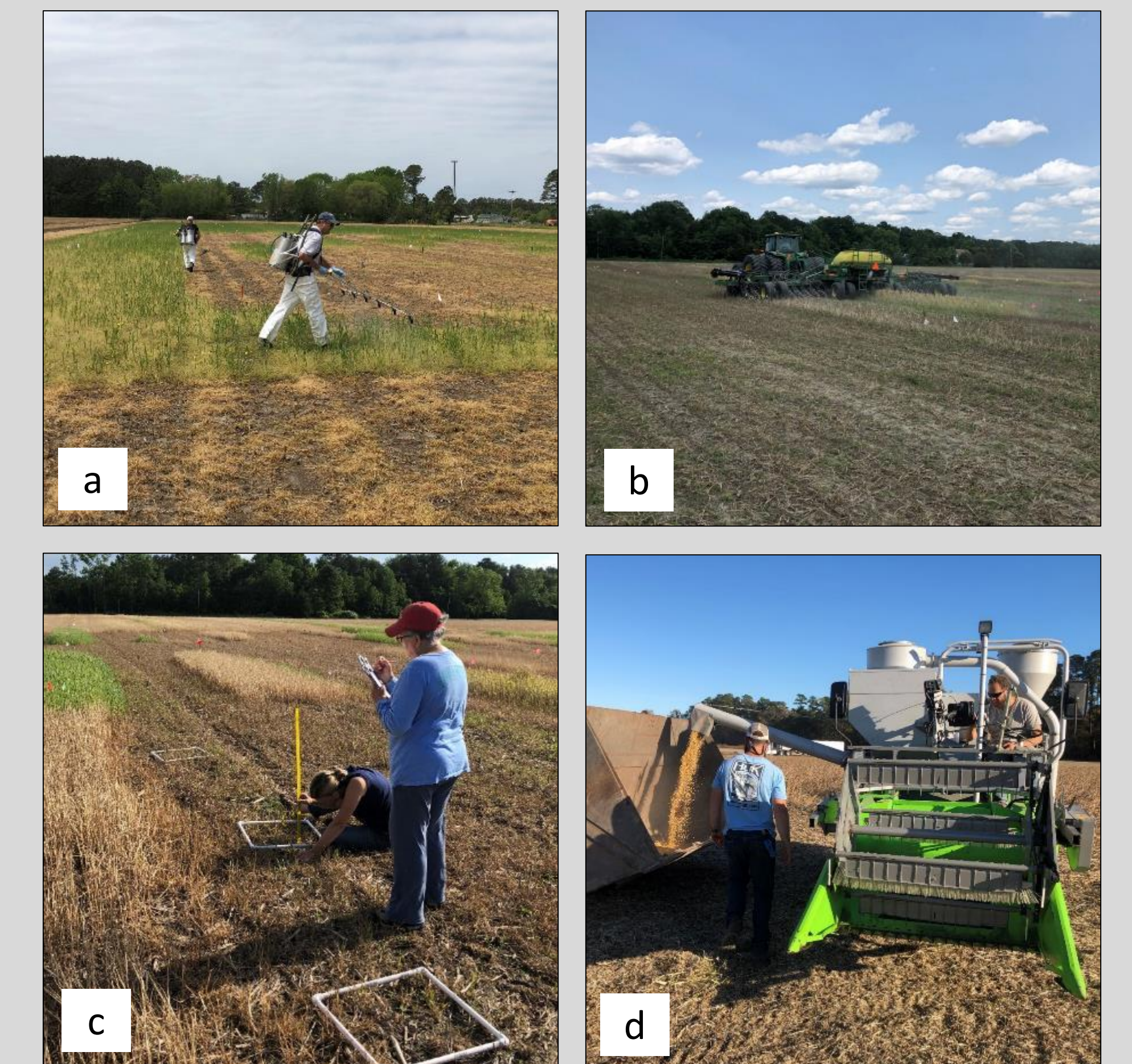


Figure 1. Experimental treatments evaluated in (a) cover crop termination/residual herbicide timing study and (b) residual herbicide study. Resid = residual; B = burndown herbicide; Fig 1a residual herbicide = Linex + Dimetric



(a) Herbicide application on common ragweed; (b) Planting soybean; (c) Counting common ragweed; (d) Harvesting soybean

Results

- When herbicide was applied only at cover crop burndown, common ragweed was more prevalent when cover crops were terminated on 4 April than when terminated 29 April or at soybean planting (Figure 2).
- Delaying cover crop burndown until planting (“planting green”) and applying herbicide only at soybean planting resulted in lower common ragweed prevalence in soybean than applying herbicide twice—at 4 April cover crop burndown and at soybean planting—regardless of whether residual herbicide was included at planting or not (Figure 3).
- There was less common ragweed in soybean when residual herbicide was applied at planting (late-May to early-June) versus at cover crop burndown (2 to 4 wks prior to planting) (Figure 4).
- Residual herbicides decreased ragweed prevalence compared to the no residual herbicide control at one location, but this was not observed at the second location (Figure 5).

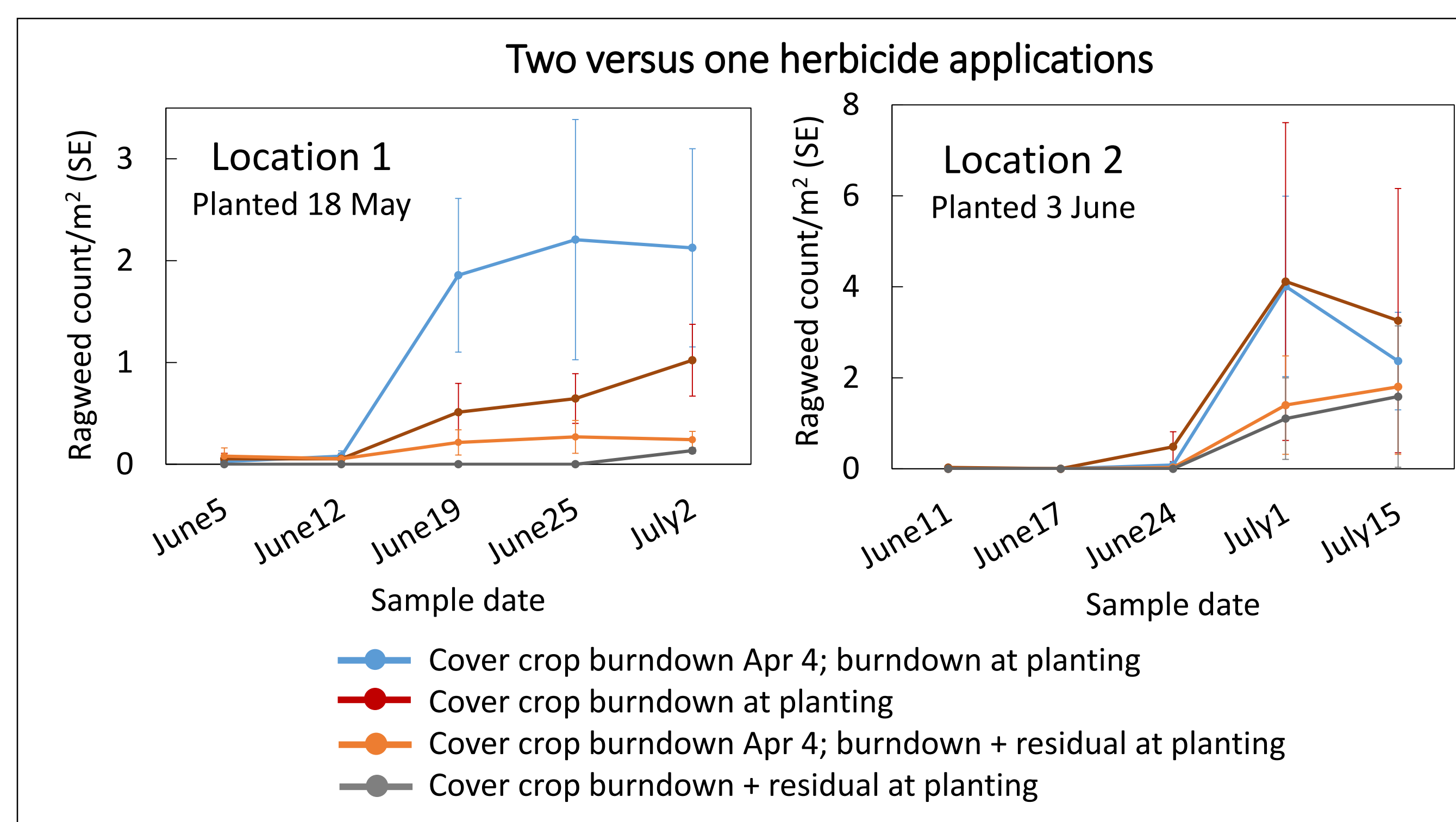


Figure 3. Common ragweed prevalence when herbicides applied twice (4 Apr and soybean planting) versus when herbicides applied only at planting

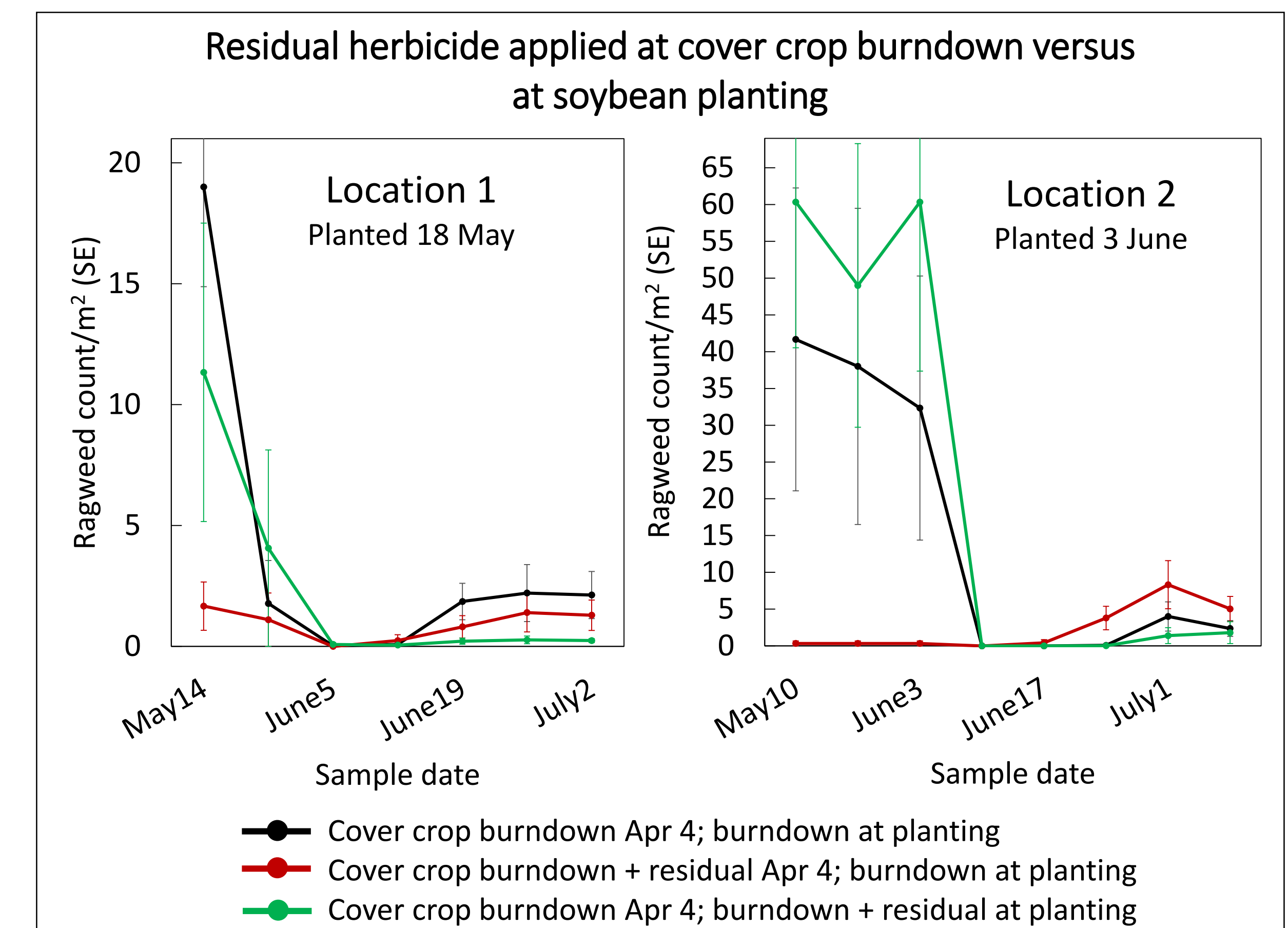


Figure 4. Common ragweed prevalence when residual herbicide applied at cover crop burndown (4 Apr) versus at soybean planting

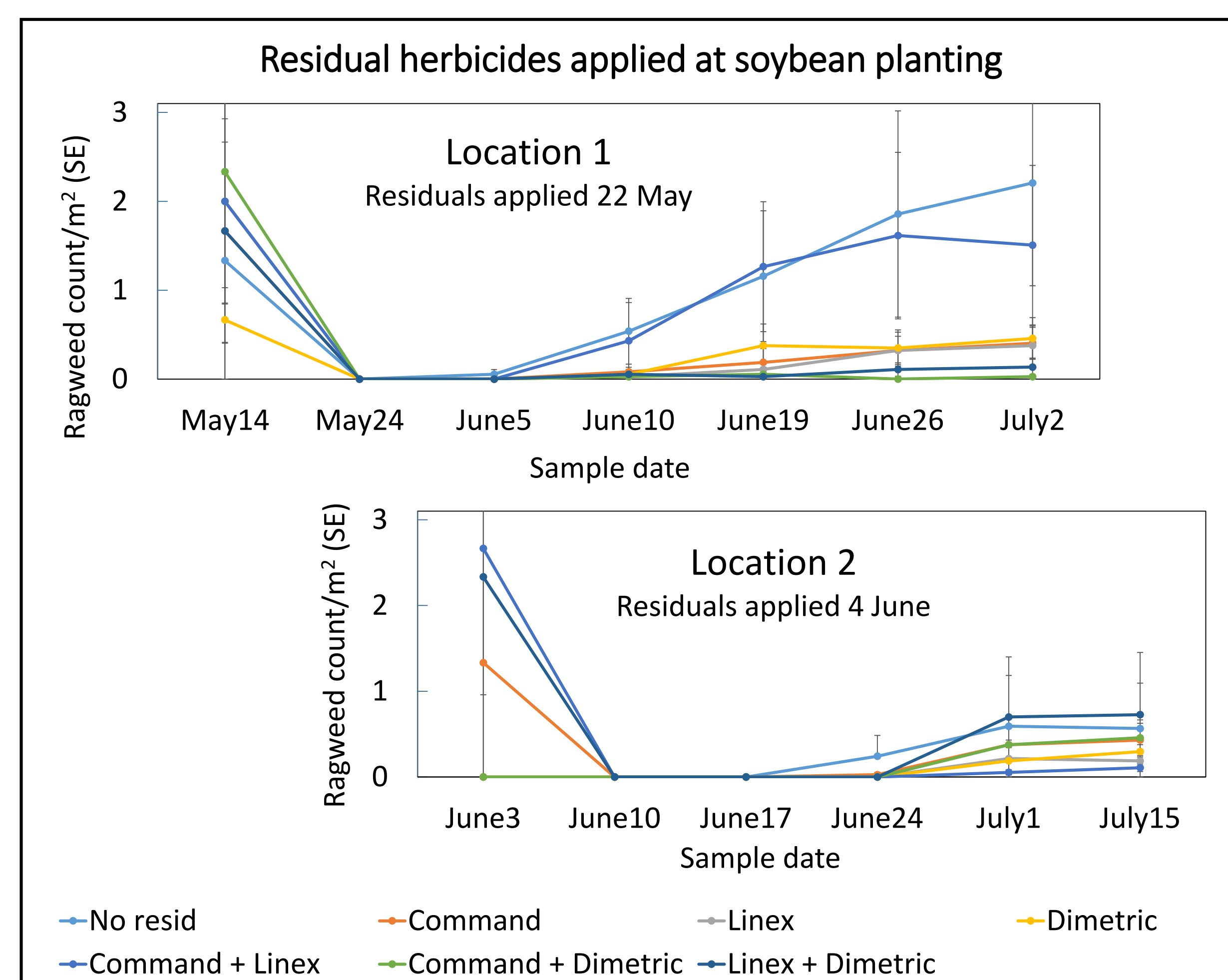


Figure 5. Common ragweed prevalence following various residual herbicides

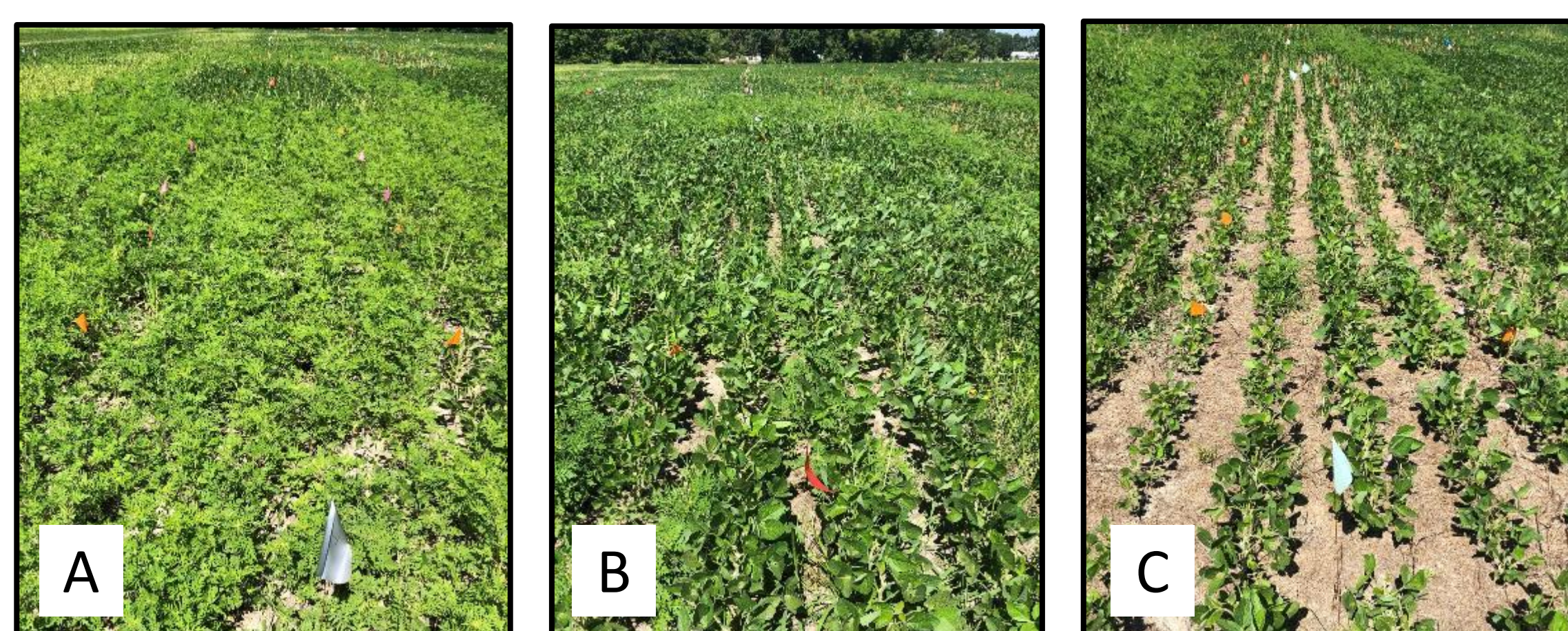


Figure 2. Common ragweed when cover crops were terminated on 4 Apr (A), 29 Apr (B), and 18 May at soybean planting (C); no residual herbicide used. Photos taken 2 Jul 2019.

Conclusions

- Ragweed emerged in early May in 2019
- Presence of cover crop may reduce ragweed, but herbicide timing seems more important
- “Planting green” + herbicide application at planting that included residuals provided good control of ragweed
- Soybean yield was not affected by delaying cover crop burndown or by using any of the residual herbicides