



# Research Title: Volunteer Annual Ryegrass as Forage and Cover Crop

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## BACKGROUND

- Dual-purpose crops are those that can be used for more than one purpose. Ryegrass can be considered a dual-purpose grass because it can be used as forage and cover crop.
- Even though cover cropping is not popular in the US, Trostle (2018) from Texas A&M AgriLife reported producers across Texas are becoming more familiar with the concepts, asking about it, and trying it in some way.
- Ditscha and Alley (1991) stated that rye's winter hardiness makes it ideal to be a winter cover crop.
- In 2018, Bowman and Wallander (2021) reported rye to be one of the most common cover crops on soybean systems, Figure 1.

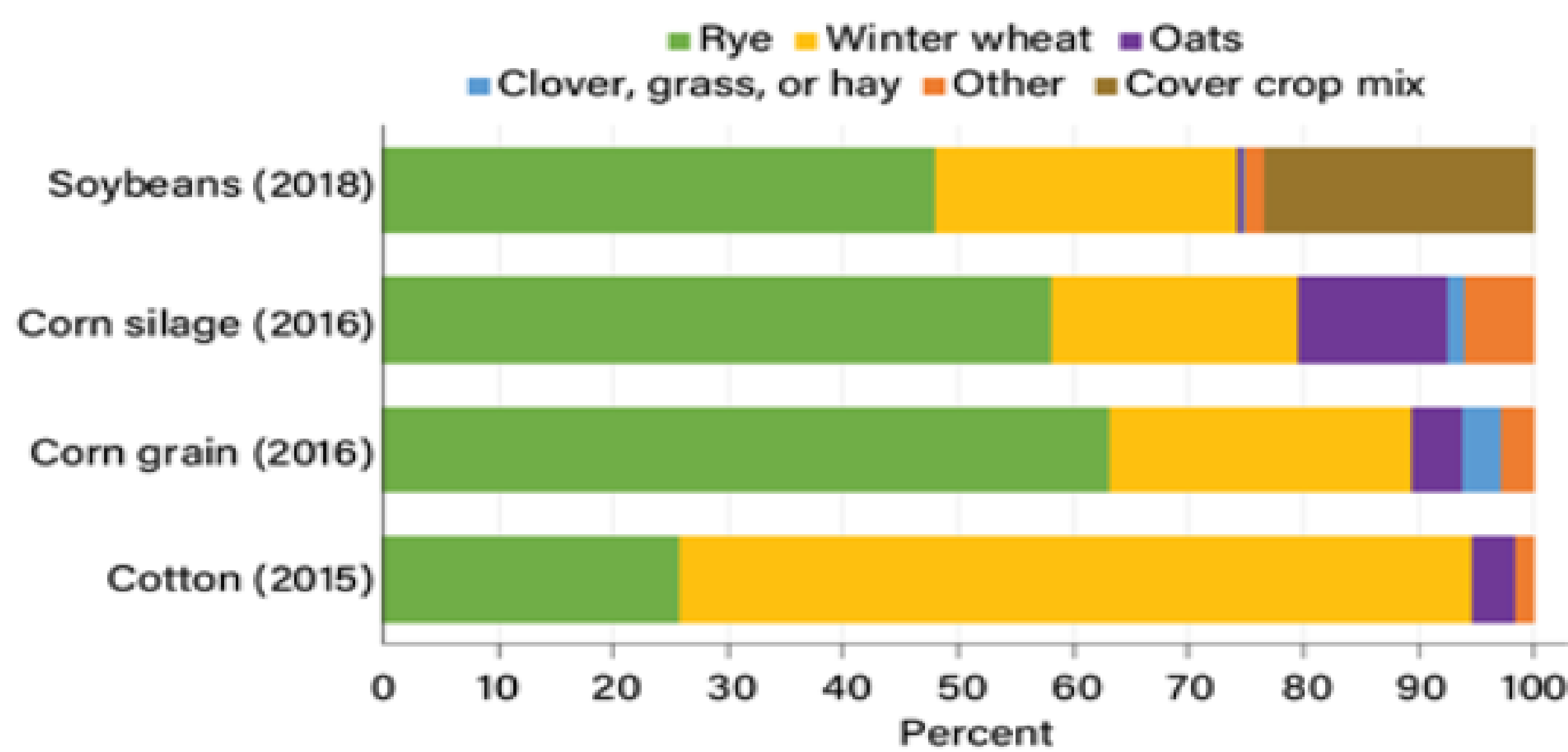


Figure 1. Survey Report of Cover Crops Used in the US in Cotton, Corn Grain, Corn Silage and Soybean from 2015 to 2018  
Source: Bowman and Wallander, 2021

## OBJECTIVE

- This study evaluates ryegrass as both forage and cover crop on no-till soybean as well as the effectiveness of herbicide treatments on ryegrass control.

## METHODOLOGY

Plots were established on November 15, 2019 and December 23, 2020 in fields with emerged volunteer annual ryegrass. Individual plots were 1.5 m (5 ft) in width and 6.1 m (20 ft) in length with 4 replications in a randomized complete design. Herbicide plots received a treatment of Paraquat or Glyphosate alone or in combination with one or more of the following residual herbicide active ingredients: Atrazine, S-metolachlor, metribuzin, Flumioxazin, Pyroxasulfone, and Carfentrazone.

All forage and cover crop plots were terminated with Glyphosate or Paraquat at least 2 weeks prior to planting soybeans. Soybeans were seeded on April 21, 2020 and June 23, 2021 with a glyphosate and dicamba (Extend Flex) tolerant variety. All plots received a post emergent application of glyphosate, S-metolachlor, and dicamba to control weeds until harvest. Figure 2 shows a picture of soybean over the terminated ryegrass. Soybean seed yield was determined by hand harvesting a 1 m row in representative plots in 2020; in 2021 plots were harvested with a plot combine.



Figure 2. No-till Soybeans in an annual ryegrass cover crop plot

## RESULTS

- The average forage yield for a late January clipping was 663 kg/ha (592 lbs/ac) of dry matter in the 2019-20 trial and 503 kg/ha (449 lbs/ac) in the 2020-2021 season. The average forage yield for plots clipped in March or April prior to cover crop termination was 2,764 kg/ha (2,468 lbs/ac) of dry matter in the 2019-2020 season and 2,446 kg/ha (2,184 lbs/ac) in the 2020-2021 season.
- Early 2020 annual ryegrass clippings (Figure 3) had 23 percent crude protein and March 2020 clippings has 16.4 percent crude protein.
- Soybean plots in 2020 suffered from a hot dry growing season and grasshopper damage resulting in soybean yields of 349.7 kg/ha (5.2 bu/ac) from the herbicide treatments and 369.9 kg/ha (5.5 bu/ac) from the cover crop treatment. In 2021, soybean yields were 1,055 kg/ha (15.7 bu/ac) from the herbicide treatments, and 1,198 kg/ha (17.8 bu/ac) from the cover crop treatment. In addition, treatments that harvested the ryegrass forage before termination prior to planting yielded 1,396 kg/ha (20.8 bu/ac).
- Table 1 shows the levels of weed control for the various treatments. Some treatments controlled and suppressed annual ryegrass and winter broadleaf weeds up to 120 days after the initial treatment. The cover crop and forage treatments also provided suppression of fall broadleaf and spring weeds.



Figure 3. Forage harvest to estimate grazing production

Treatment	Fall An. Ryegrass	Spring Broadleaves
Cover Crop - Volunteer Annual Ryegrass	0	90-100
Forage Harvest followed by Spring Herbicide	95	85-100
Fall Atrazine	0	73
Glyphosate or Paraquat in fall and spring	90	85
Paraquat + Pyroxasulfone + Carfentrazone in Fall	100	85
Paraquat + Flumioxazin in Fall	100	80
Paraquat + S-metolachlor + Metribuzin in Fall	100	63

Table 1. Percent Control of Fall Annual Ryegrass and Spring Broadleaf Weeds at the Time of Soybean Planting for Herbicide, Forage, and Cover Crop Treatments in Northeast Texas, April 2021.

## CONCLUSIONS

- There was no statistically significant difference between soybean seed yields following an annual ryegrass cover crop compared to a herbicide fallow treatment, suggesting potential cover crop viability.
- Treatments that included forage production have the potential to produced up to 663 kg/ha (592 lb/ac) of dry matter in January and 2,764 kg/ha (2,468 lb/ac) of dry matter in March/April.
- In 2020, treatments that included a forage harvest and stubble termination showed numerically higher soybean yields.

## ACKNOWLEDGMENTS

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