

**Evaluating Strategies
for Increasing Plant Diversity
in Crested Wheatgrass Seedings
[Elko County, NV]**

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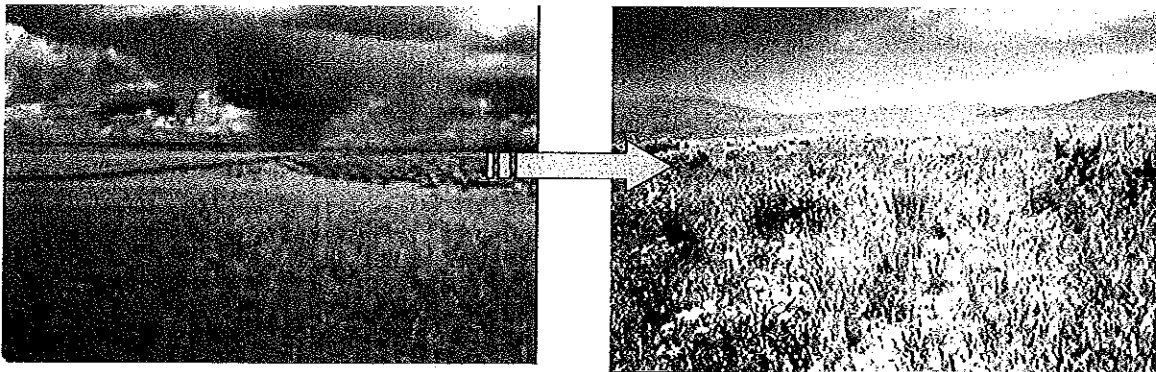
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“Assisted Succession”

(Various studies: Roundy, Anderson, Shaw, Pellant, Mangold, others)

- **Restoration of weed-threatened areas may require “rehabilitation” *then* “restoration”**



Research Objectives

- 1 - Determine the effect of crested wheatgrass (*Aropyron desertorum*) control methods on wheatgrass density and cover.**
- 2 - Determine the effect of crested wheatgrass control methods and revegetation on establishment of seeded species.**

Great Basin Native Plant Selection & Increase Project

Companion studies in:

- **Utah**
- **Oregon**
- **Idaho**
- **Nevada**

Crested Wheatgrass Control and Revegetation Treatments

- **Disking**
- **Spring-applied glyphosate**
- **Disking + spring-applied glyphosate**
- **Spring- + fall-applied glyphosate**
- **Control (no treatment)**

The study site is comprised of five 5-acre blocks, using a randomized block, split-split plot design. Each 1-acre treatment plot was divided into seeded and unseeded sub-plots.

Treatment Chronology

- **During November 2007, “disked only plots” were 3-way disked.**
- **In May, 2008 “spring-applied herbicide plots” and “combined disked and herbicide plots” were sprayed with 66 oz. glyphosate/ac.**
- **In early October 2008, “combined spring- and fall-applied herbicide plots” were sprayed with 66 oz. glyphosate/ac.**
- **In late October 2008, sub-plots were seeded by personnel from the NRCS Aberdeen Plant Materials Center with a Truax Rough Rider rangeland drill.**

Table 1. Final seeding mix for South Fork study plots, Elko County, NV, in sandy loam soil (Orovada Puett association), approximately 8" precipitation zone.

Species	Kind/Variety	Seeding Rate (PLS lb/acre)	Total No. lb (for 12.5 acres)
Indian ricegrass ¹ (<i>Achnatherum hymenoides</i>)	'Nezpar'	2.0	25
Bottlebrush squirreltail ¹ (<i>Elymus elymoides</i>)	Toe Jam Creek	2.0	25
Needle-and-thread grass ² (<i>Stipa comata</i>)		2.0	25
Basin wildrye ³ (<i>Elymus cinereus</i>)	'Magnar'	2.0	25
Bluebunch wheatgrass ³ (<i>Pseudoroegneria spicata</i>)	'Secar'	1.0	12.5
Sandberg bluegrass ⁴ (<i>Poa secunda</i>)		0.75	9.4
Munro globemallow ⁴ (<i>Sphaeralcea munroana</i>)		0.50	6.25
Lewis flax ³ (<i>Linum lewisii</i>)	'Appar'	0.75	9.4
Western yarrow ⁴ (<i>Achillea millefolium</i>)		0.20	2.5
Wyoming big sagebrush ³ (<i>Artemisia tridentata wyomingensis</i>)		0.20	2.5
Spiny hopsage ⁵ (<i>Grayia spinosa</i>)		0.50	6.25
Totals		11.9	148.8

¹ From Granite Seed Co.

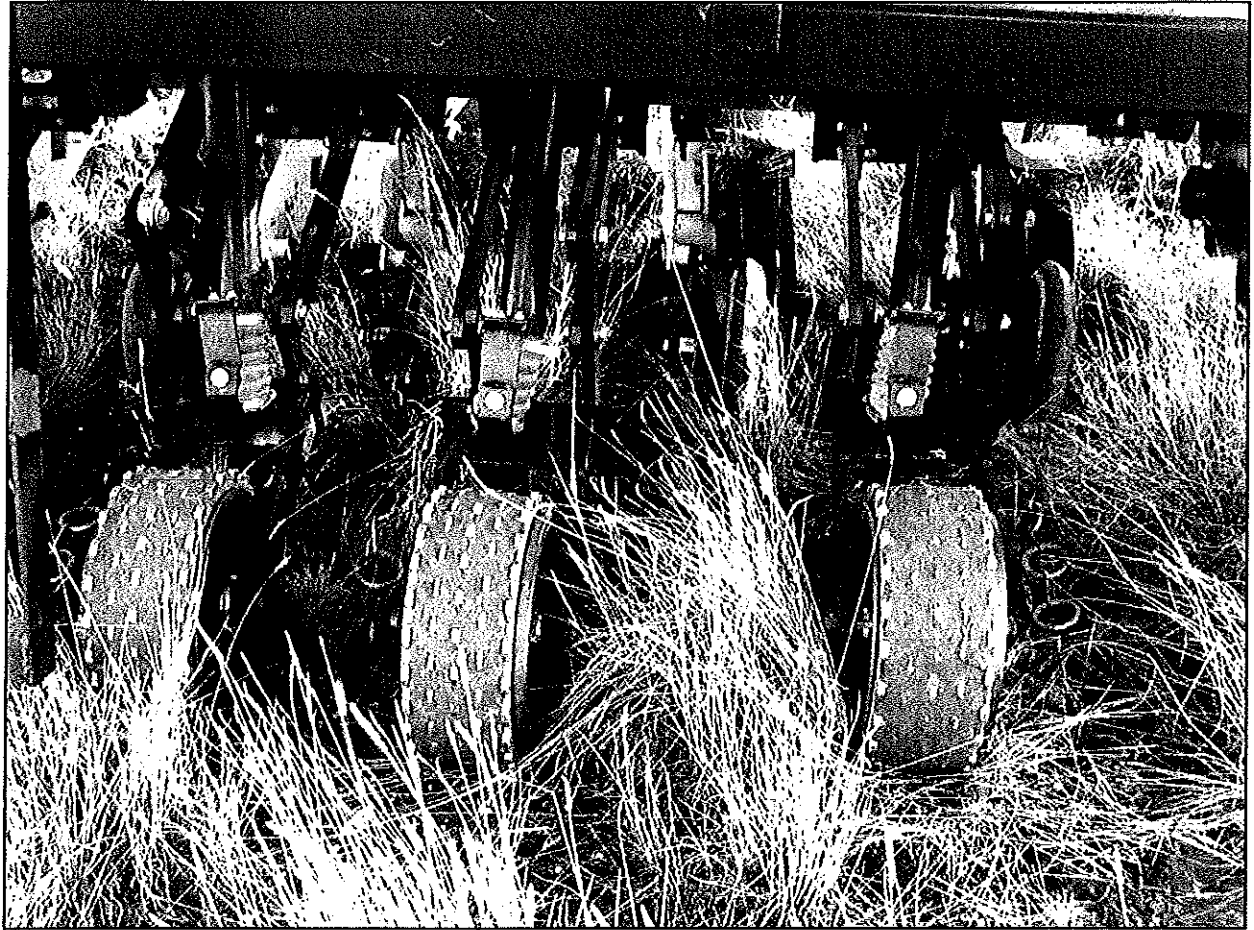
² From BFI Native Seeds

³ From Comstock Seed Co.

⁴ From FS Collection

⁵ From Native Seed Co.



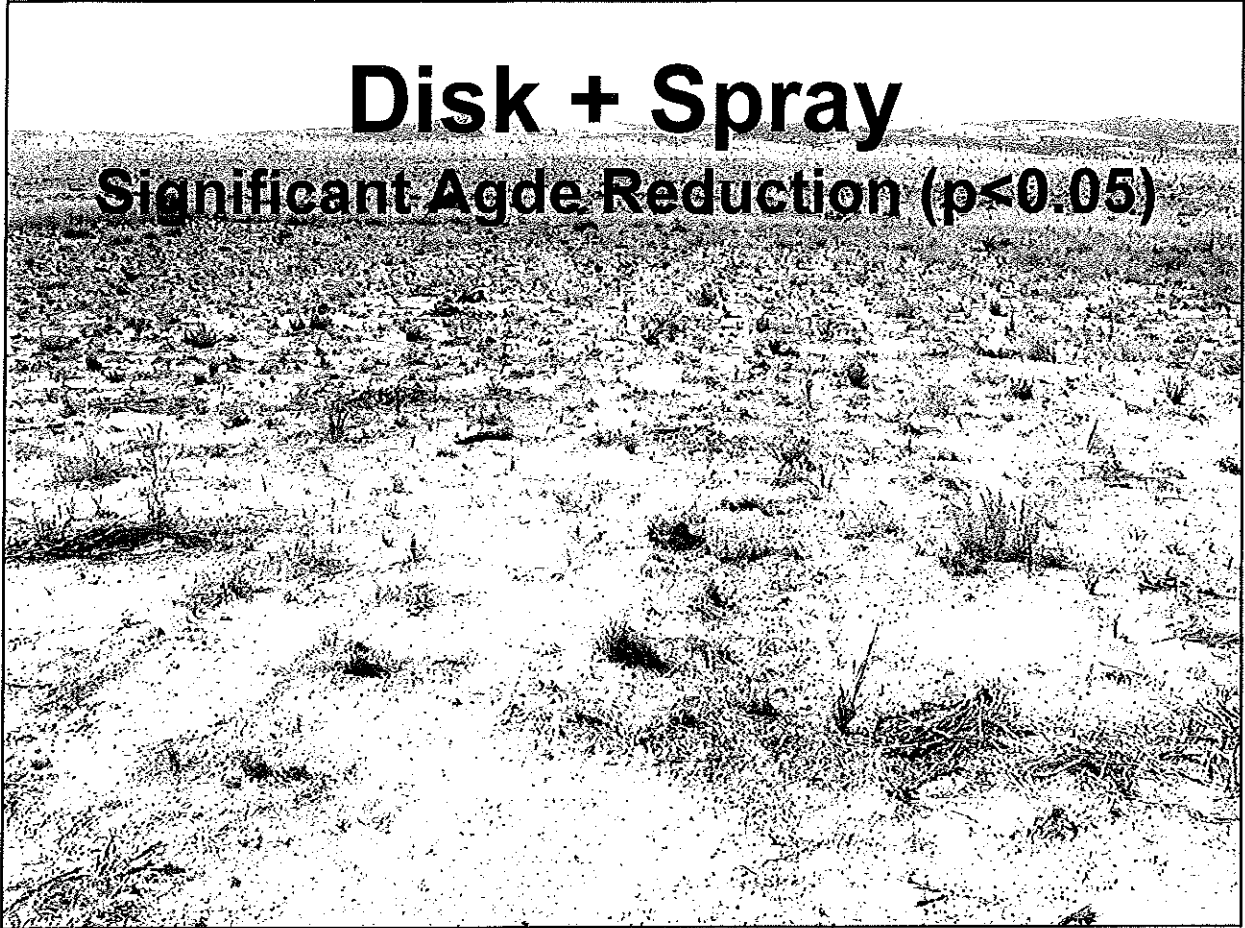


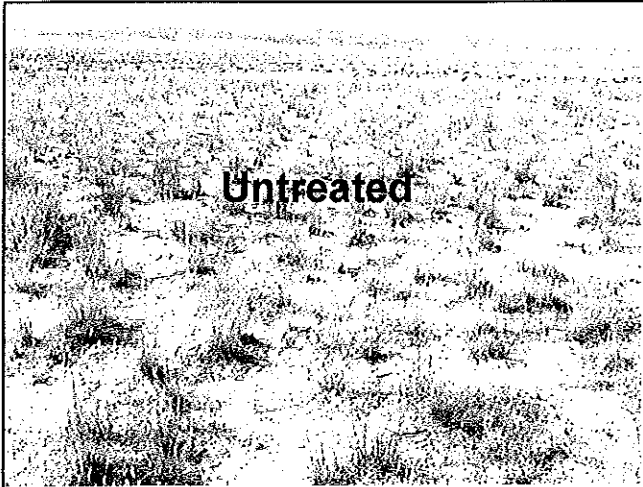
Data Collection – 2009 & 2010

- **For crested wheatgrass, we estimated herbaceous cover, density, and seedling frequency in ten 0.5 m² quadrats placed randomly on each of 5 transects and perpendicular to each belt transect**
- **Density for seeded native species was measured within these same quadrats**

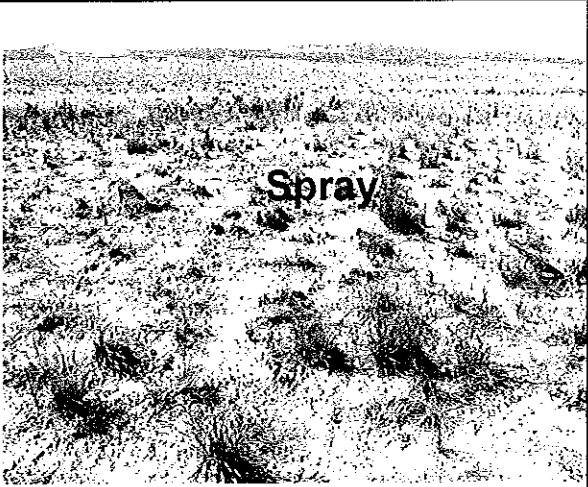
Disk + Spray

Significant Agde Reduction ($p < 0.05$)





Untreated



Spray



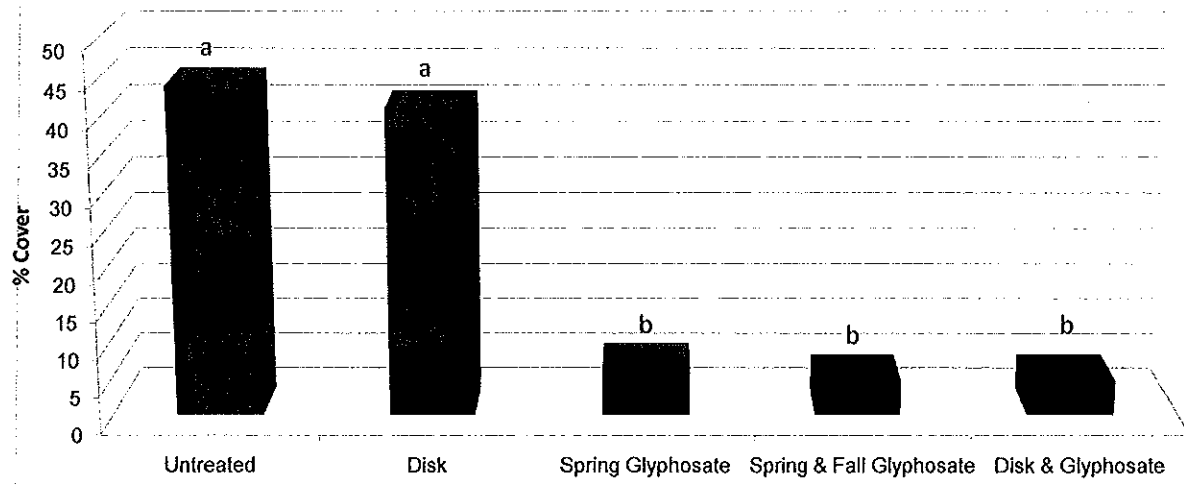
Spray 2X (spring & fall)

**2 Treatments That
Reduced Agde ($P < 0.05$)**

Seeded Species Establishment - First Growing Season (2009)

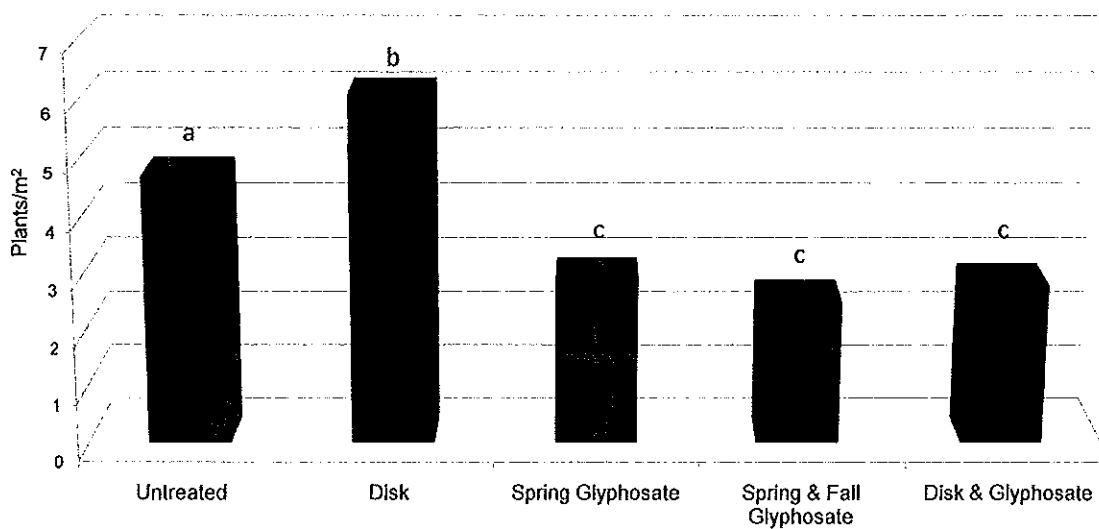


Fig. 1. Effects of Treatments on Crested Wheatgrass Cover, 2009.*



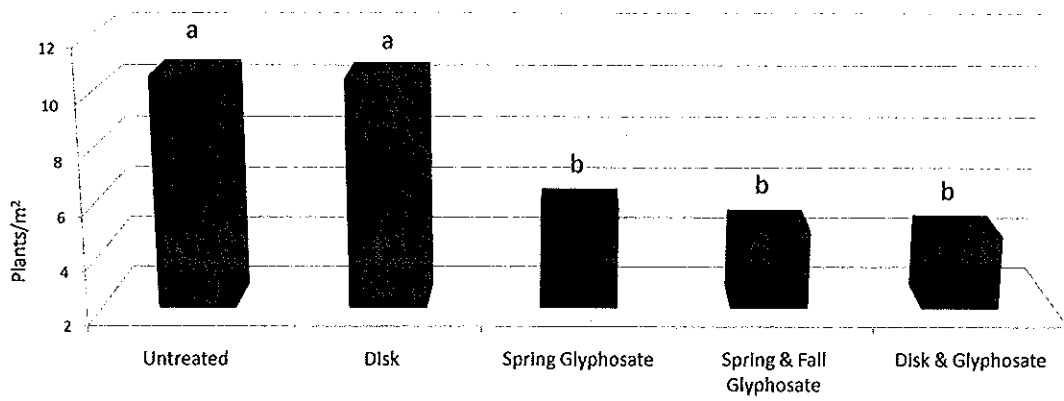
*Means with differing letters are significantly different ($p < 0.05$)

Fig. 2. Effects of Treatments on Crested Wheatgrass Density, 2009.*



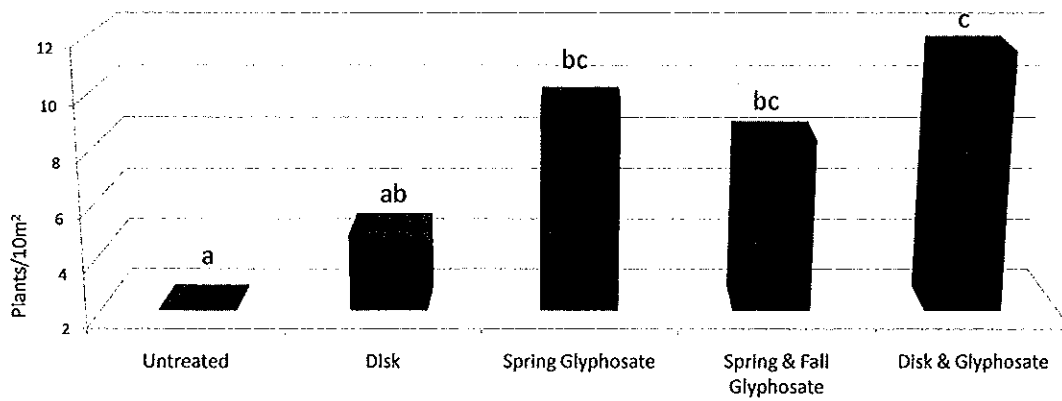
* Means with differing letters are significantly different ($p < 0.05$)

Fig. 3. Effects of Treatments on Crested Wheatgrass Density, 2010.*



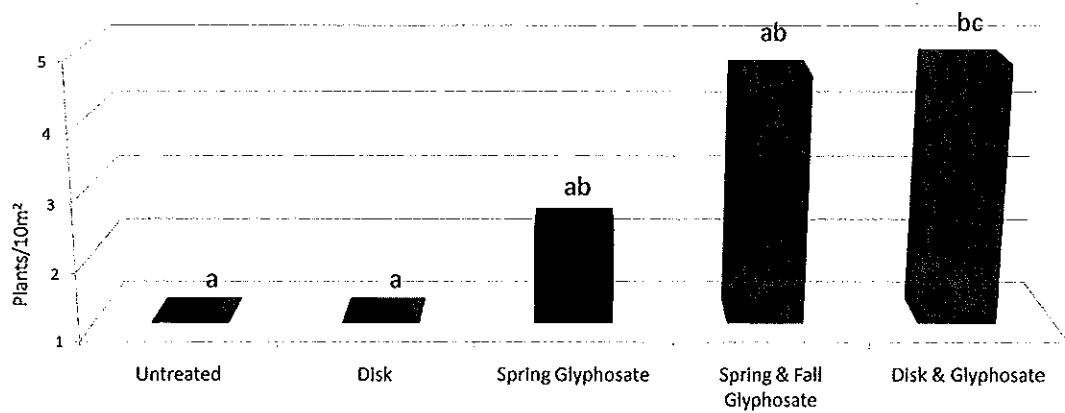
*Means with differing letters are significantly different ($p < 0.05$)

Fig. 4. Effects of Treatments on Density of Seeded Native Grasses, 2010.*



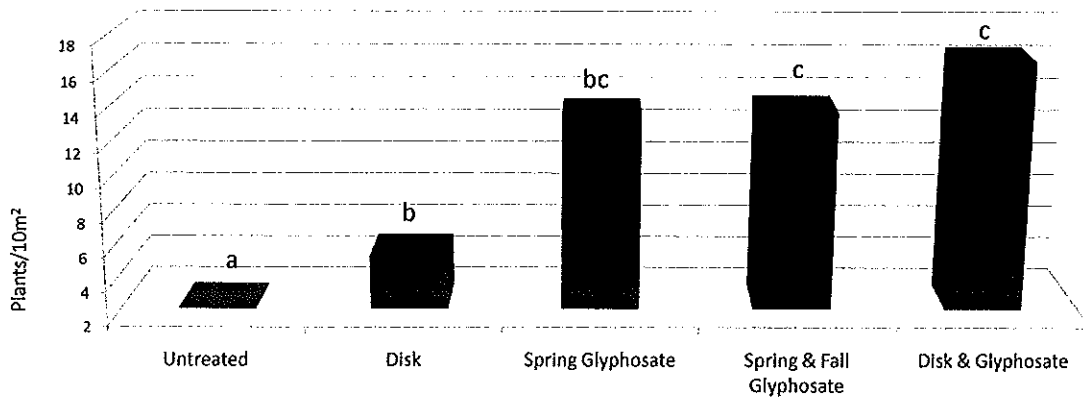
*Means with differing letters are significantly different ($p < 0.05$)

Fig. 5. Effects of Treatments on Seeded Forb Densities, 2010.*



*Means with differing letters are significantly different (p<0.05)

Fig. 6. Effects of Treatments on Density of All Seeded Species, 2010.*



*Means with differing letters are significantly different ($p < 0.05$)