



Comparison of Chemical Management Strategies for Angular Leaf Spot in Dark Tobacco

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Angular Leaf Spot Background

- *Pseudomonas syringae* pv. *tabaci* is the casual agent of ALS, a bacterial disease
- Most significant foliar disease in dark tobacco since 2015 in Kentucky and Tennessee
- Streptomycin has been the standard control
- Documented resistance to Streptomycin
- PDDL 2015-2021 Data: 28 out of 113 samples with resistance to Streptomycin



Angular Leaf Spot Research

- Field spray trials have been ongoing since 2015, at the University of Kentucky Research and Education Center in Princeton, Kentucky and Murray State University in Murray, Kentucky
- >25 chemicals have been tested for control of angular leaf spot
- Monitoring resistance to Streptomycin
- Dark tobacco variety trial, to test sensitivity of varieties to angular leaf spot
- Field monitoring project, started in 2020 and continued in 2021
- Conventional vs. no-till system trial

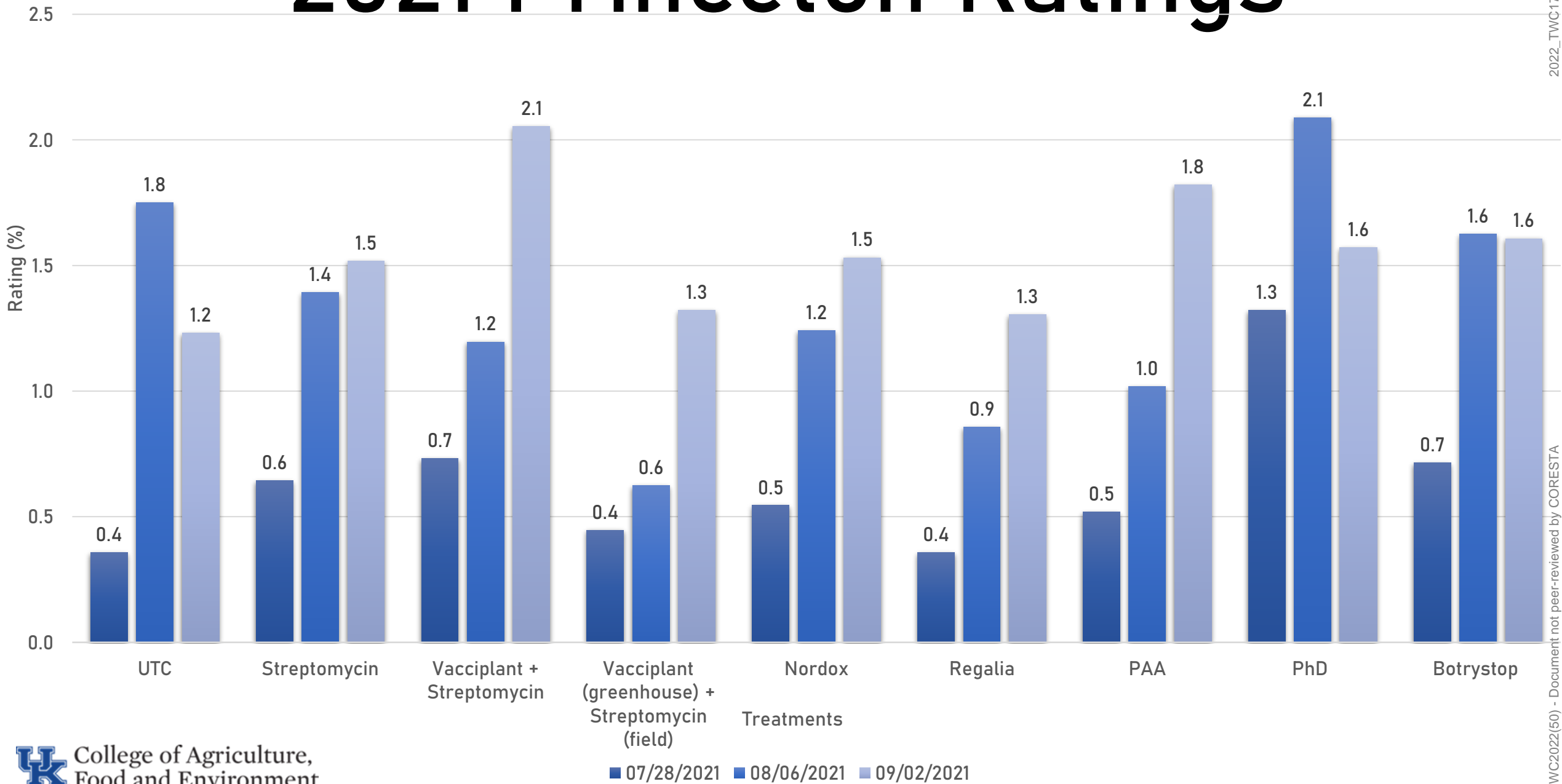
2021 Materials and Methods

- Two locations, University of Kentucky Research and Education Center in Princeton, KY and Murray State University in Murray, KY
- Variety: KT D8
- Randomized complete block design with four replications
- Four row plots, 40 ft x 13.33 ft
- Planting Population: 40 in x 32 in, 4,900 plants/ac
- Center two rows were inoculated, approximately six weeks after transplanting
- All products in these spray trials are labeled or have the potential to be labeled for tobacco production

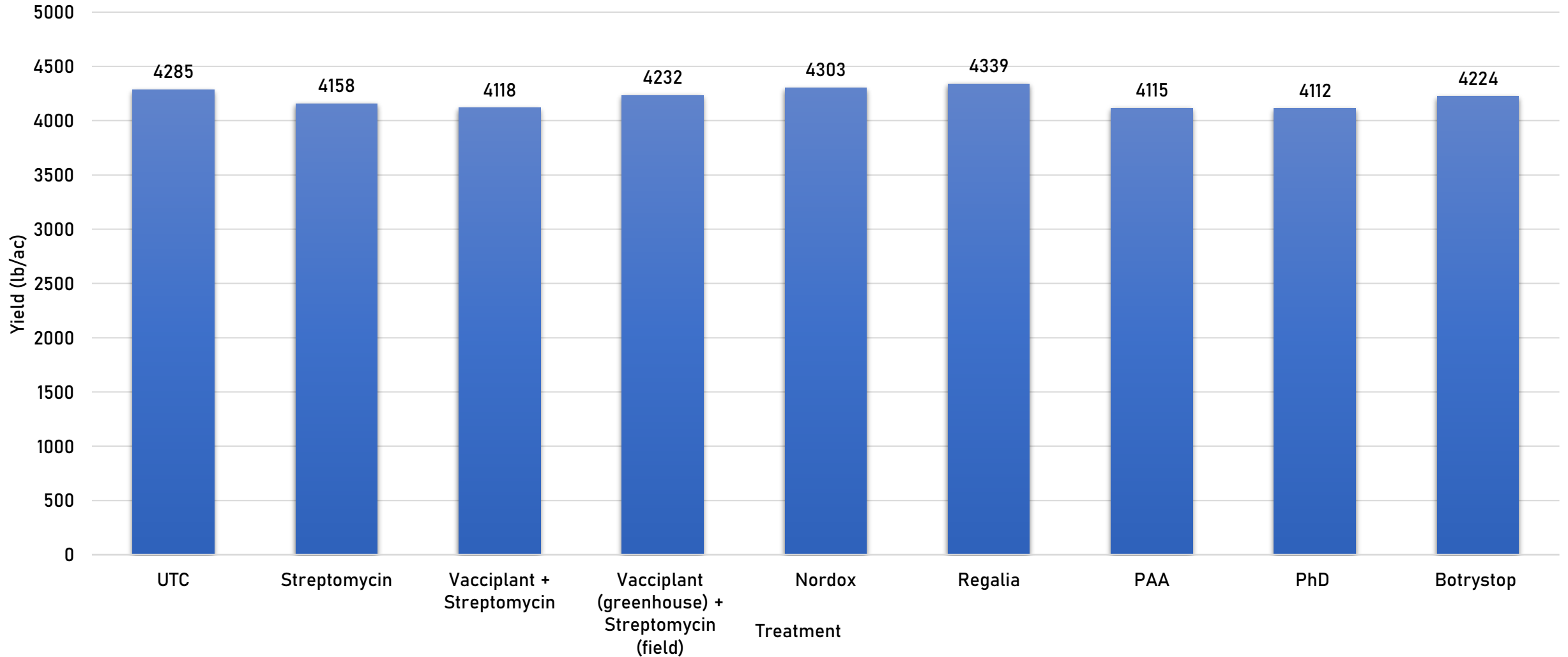
2021 Angular Leaf Spot Spray Trial Treatments, Princeton

| Trade Name/Treatment | Product Active Ingredient | Spray Application Details |
|---------------------------|-------------------------------------|--|
| Untreated Control | ----- | ----- |
| Streptomycin | Streptomycin Sulfate | 3 applications of Streptomycin |
| Streptomycin + Vacciplant | Streptomycin Sulfate and Laminarin | 3 tank mix applications of Streptomycin and Vacciplant |
| Vacciplant + Streptomycin | Laminarin and Streptomycin Sulfate | 2 applications of Vacciplant in the greenhouse and 3 applications of Streptomycin in the field |
| Nordox | Cuprous Oxide | 3 applications of Nordox |
| Regalia | Extract of Reynoutria sachalinensis | 3 applications of Regalia |
| PAA | Peracetic Acid | 3 applications of PAA |
| PhD | Polyoxin D Zinc Salt | 3 applications of PhD |
| Botrystop | Ulocladium oudemansii strain U3 | 3 applications of Botrystop |

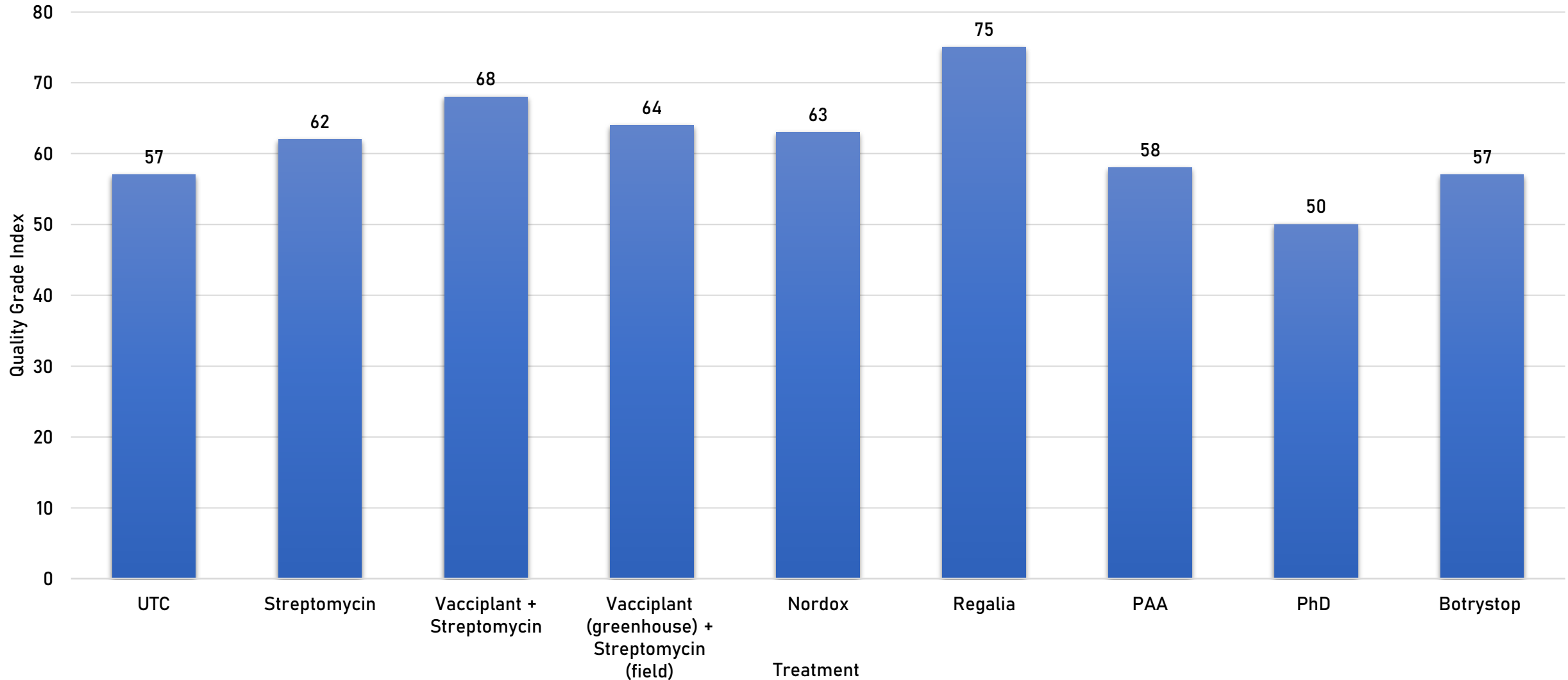
2021 Princeton Ratings



2021 Princeton Yield



2021 Princeton Quality Grade Index



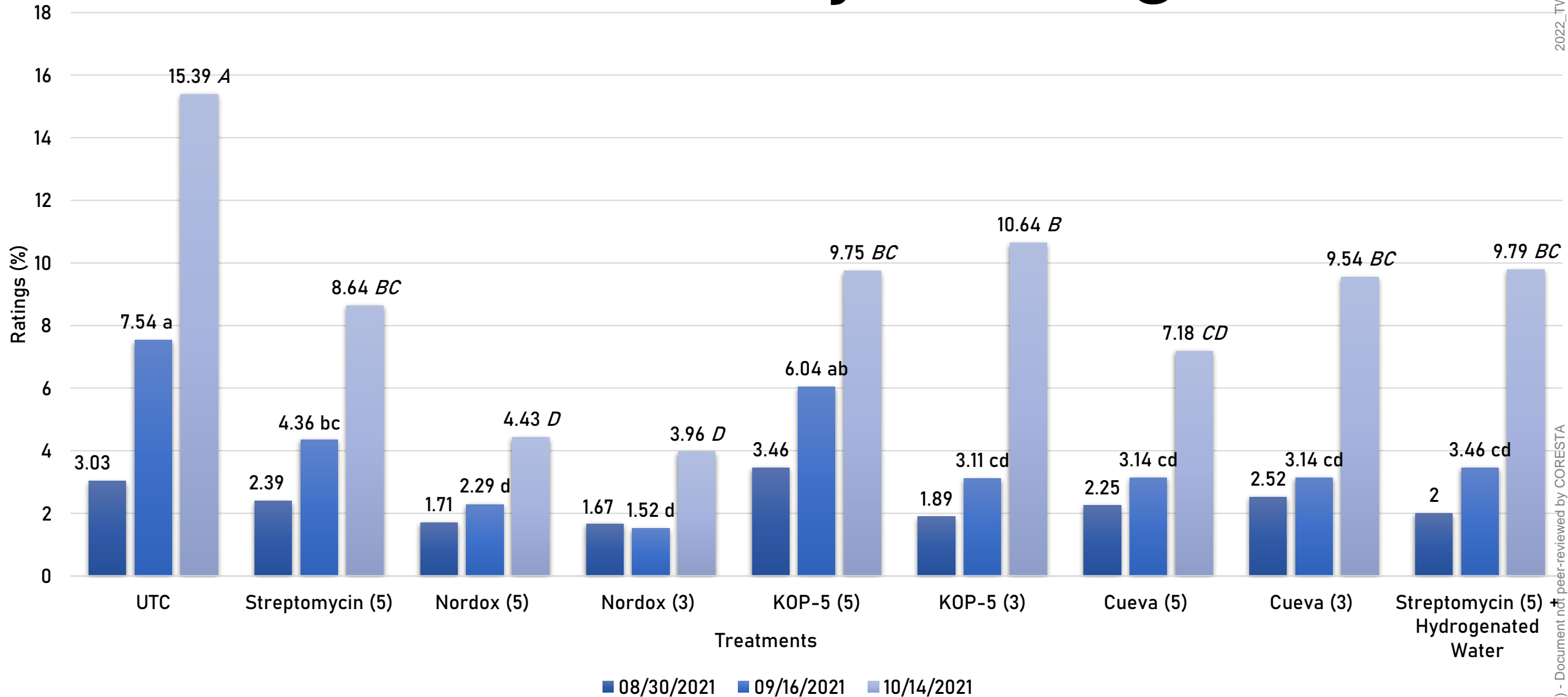
Angular Leaf Spot Research

- Field spray trials have been ongoing since 2015, at the University of Kentucky Research and Education Center in Princeton, Kentucky and Murray State University in Murray, Kentucky
- >25 chemicals have been tested for control of angular leaf spot
- Monitoring resistance to Streptomycin
- **Copper products have shown to be the best alternative to Streptomycin**

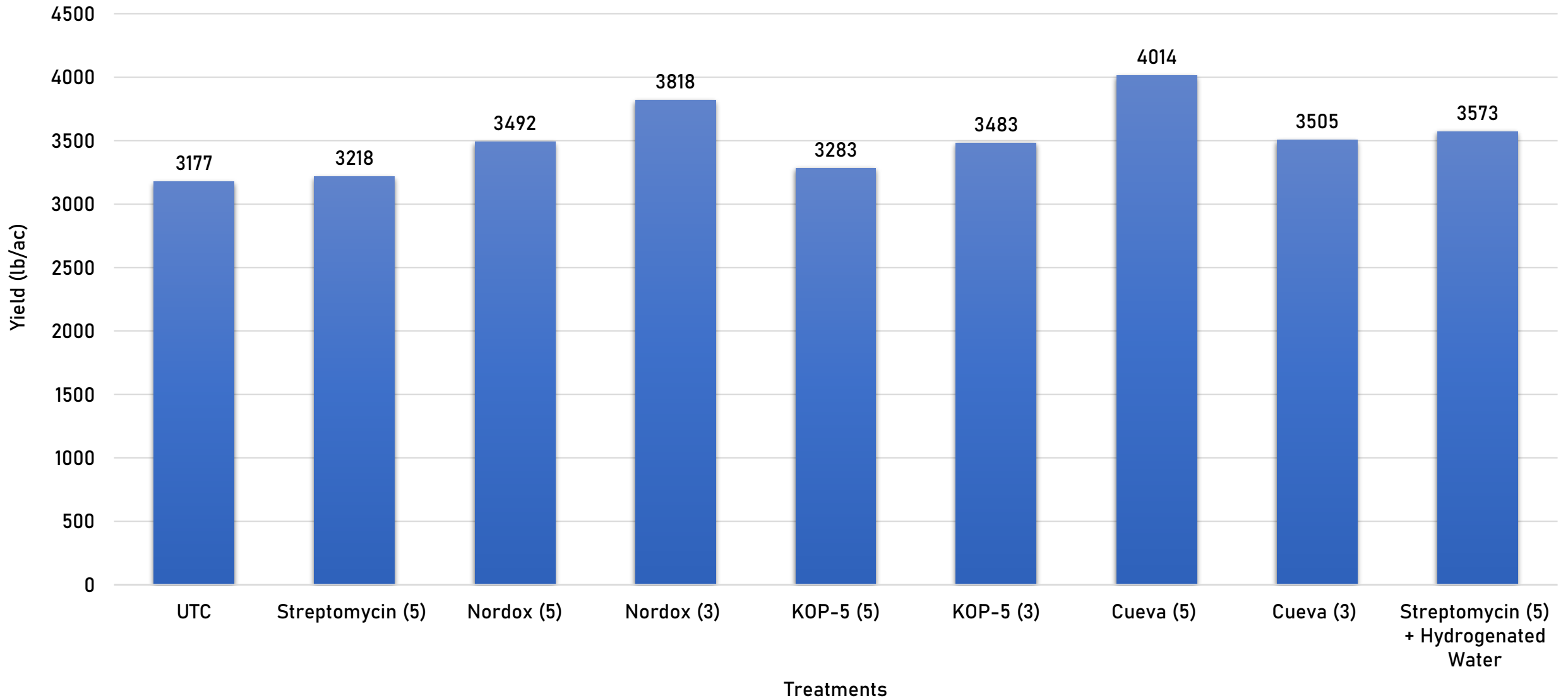
2021 Angular Leaf Spot Trial Treatments, Murray

| Trade Name/Treatment | Product Active Ingredient | Spray Application Details |
|---------------------------------------|-----------------------------|--------------------------------------|
| Untreated Control | ----- | ----- ----- |
| Streptomycin | Streptomycin Sulfate | 5 spray applications of Streptomycin |
| Nordox (5) | Cuprous Oxide | 5 spray applications of Nordox |
| Nordox (3) | Cuprous Oxide | 3 spray applications of Nordox |
| KOP5 (5) | Copper Sulfate Pentahydrate | 5 spray applications of KOP5 |
| KOP5 (3) | Copper Sulfate Pentahydrate | 3 spray applications of KOP5 |
| Cueva (5) | Copper Octanoate | 5 spray applications of Cueva |
| Cueva (3) | Copper Octanoate | 3 spray applications of Cueva |
| Streptomycin (5) + Hydrogenated Water | Streptomycin Sulfate | 5 spray applications of Streptomycin |

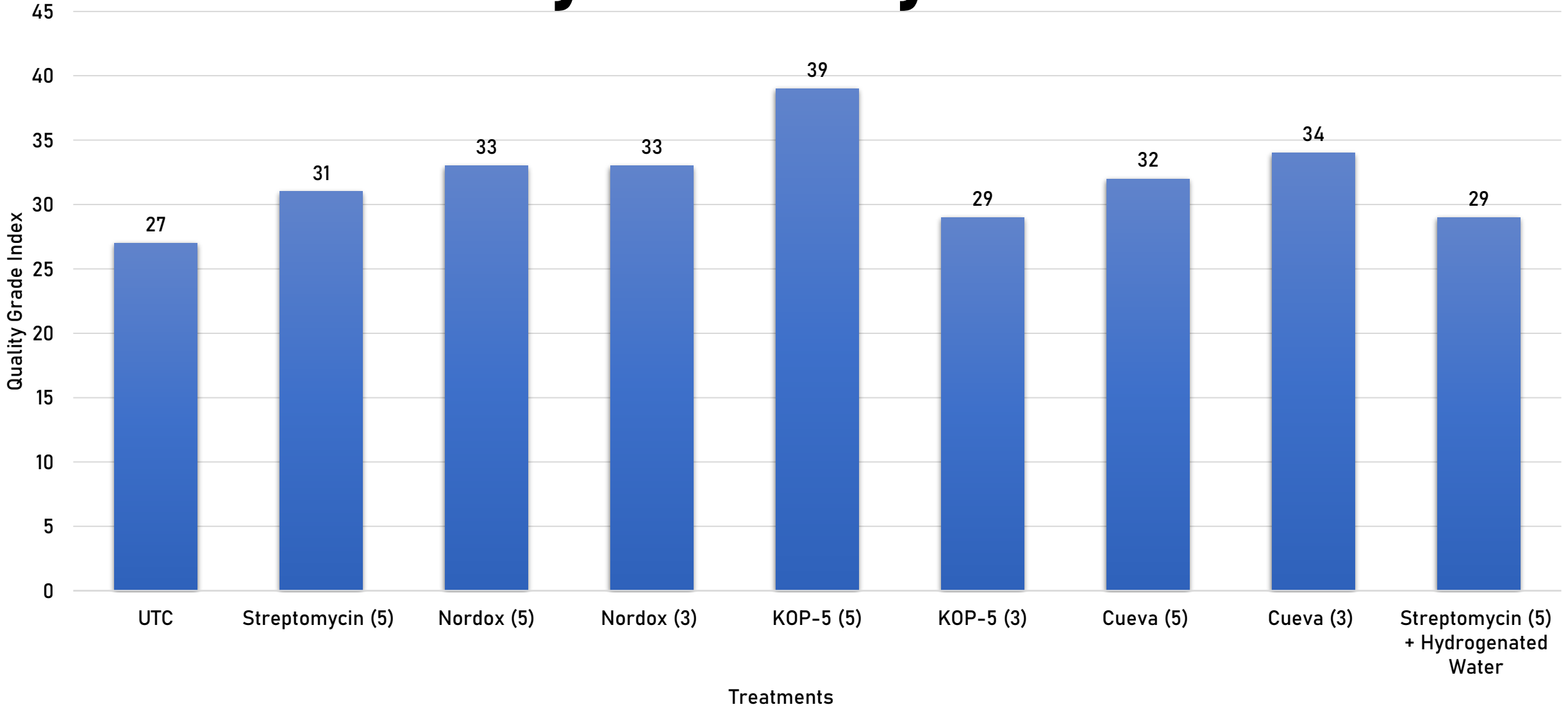
2021 Murray Ratings



2021 Murray Yield



2021 Murray Quality Grade Index



Summary and Best Management Plan

- Streptomycin can still help in fields with susceptible ALS
- For streptomycin resistant ALS:
 - Copper products have been best alternative:
 - Nordox: copper oxide, 3 to 5 lbs/A
 - Copper sulfate products: Phyton 27AG, KOP-5, Instill, 15 to 20 oz/A
 - Cueva: copper octanoate, 1 to 2 gal/A
 - Surface sterilants:
 - Oxidate (hydrogen peroxide + peroxyacetic acid) – 8 to 26 oz/50 gal
 - PAA (peroxyacetic acid + hydrogen peroxide) – 32 oz/A
- Alternate sprays with streptomycin, copper, and oxidate/PAA may be best spray plan.

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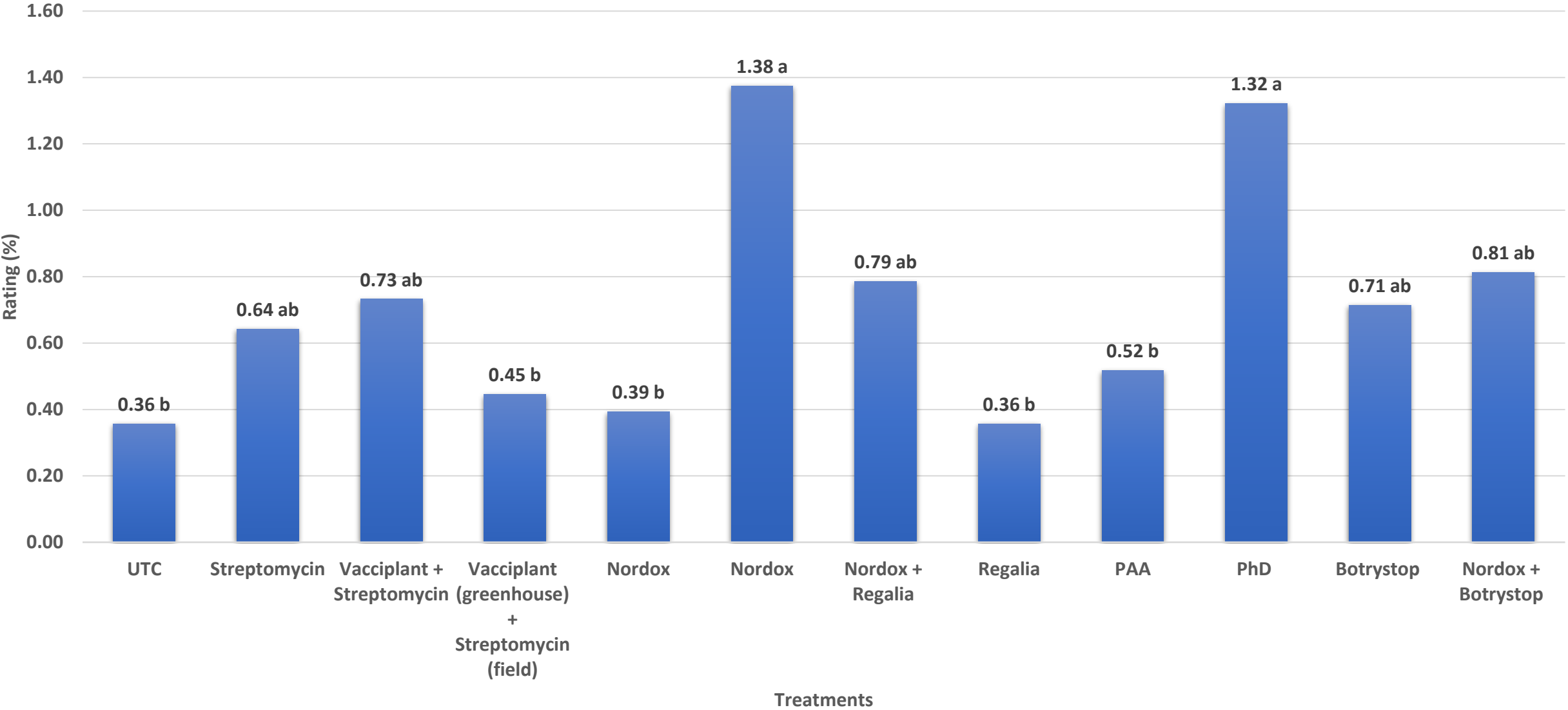


Questions?

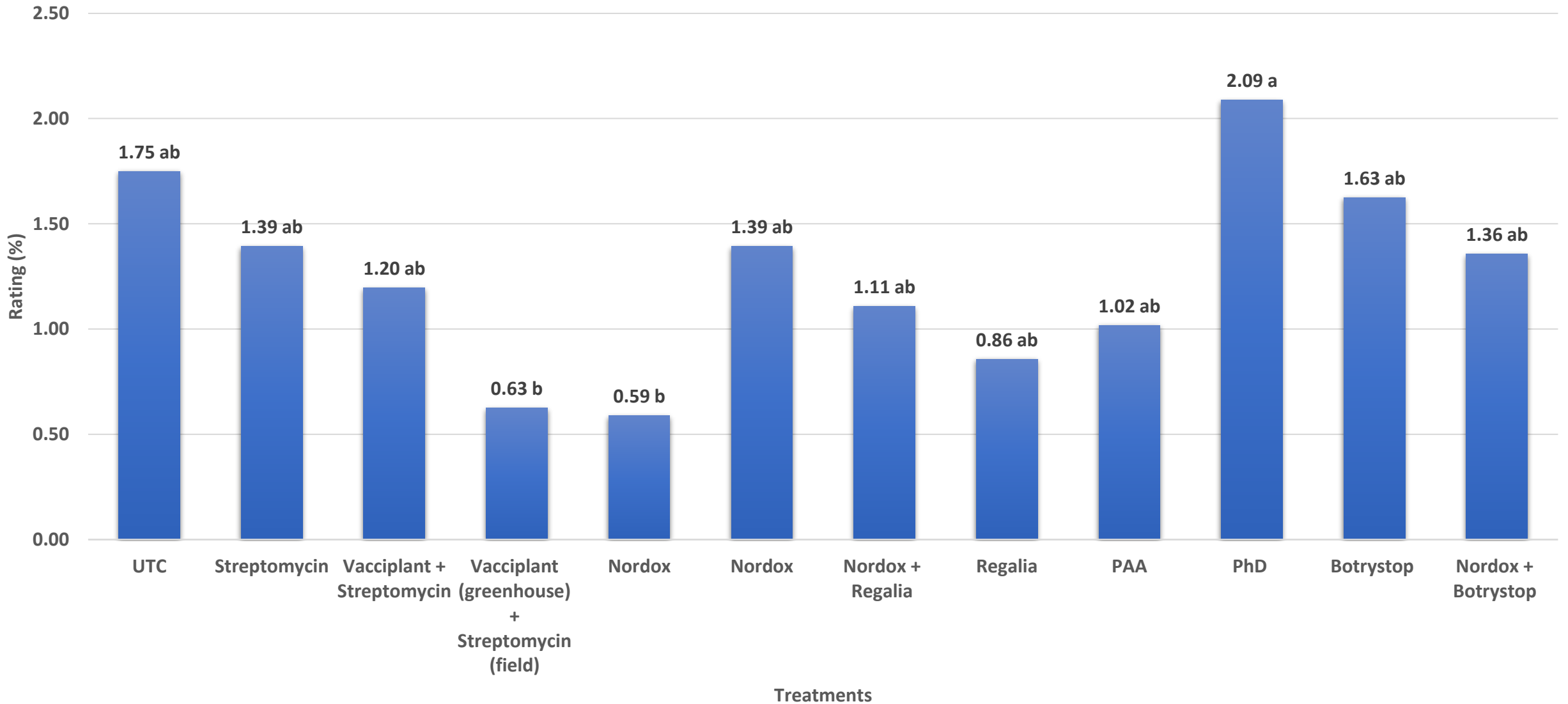
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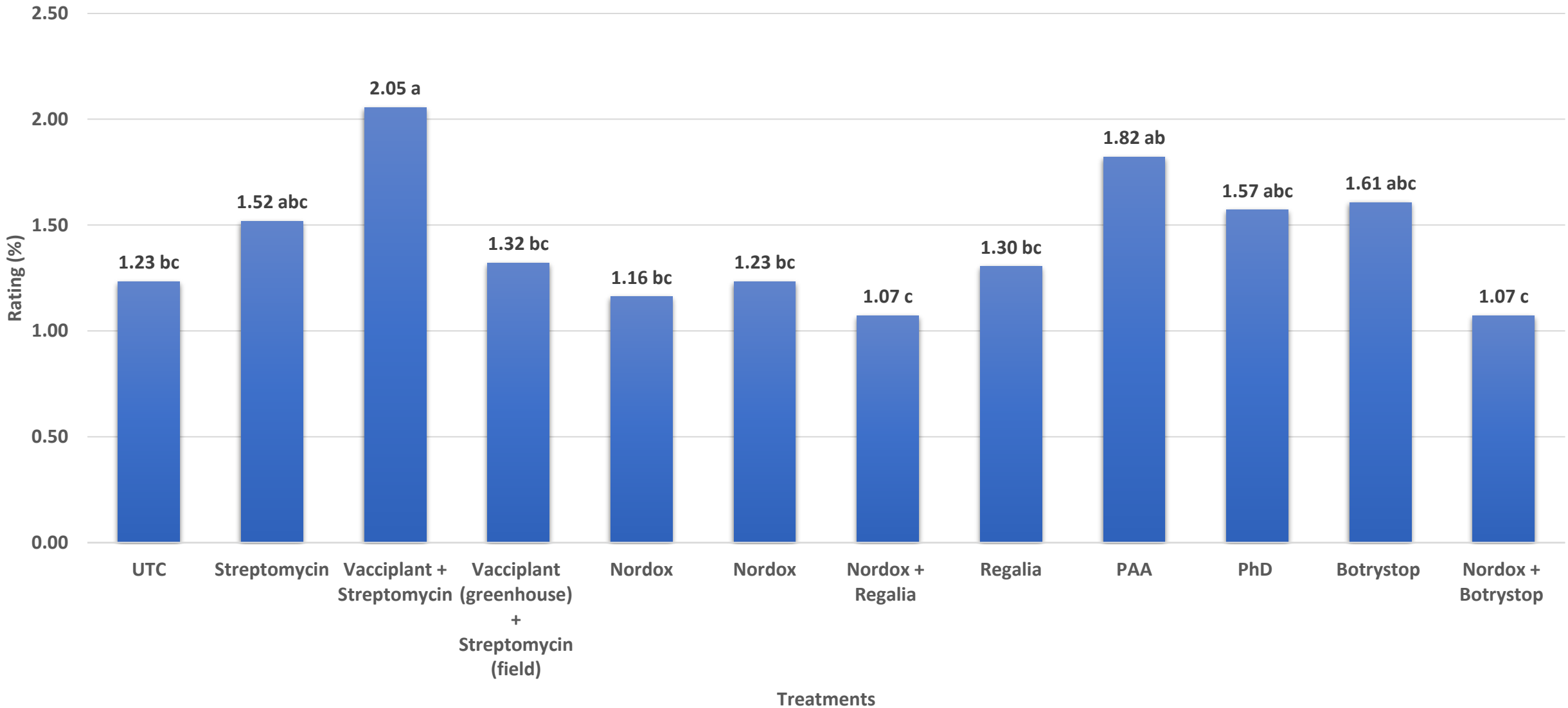
2021 Princeton First Rating



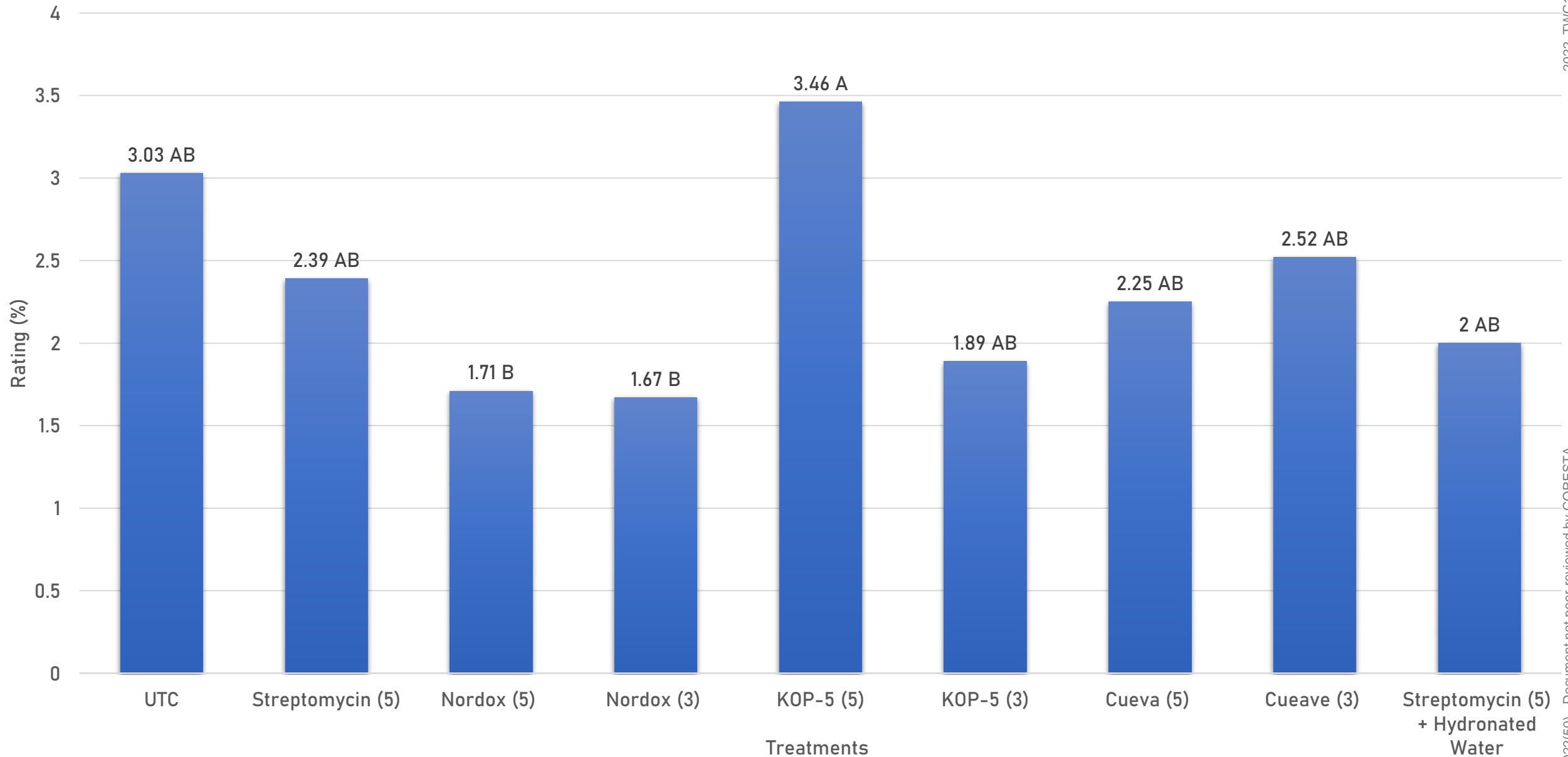
2021 Princeton Second Rating



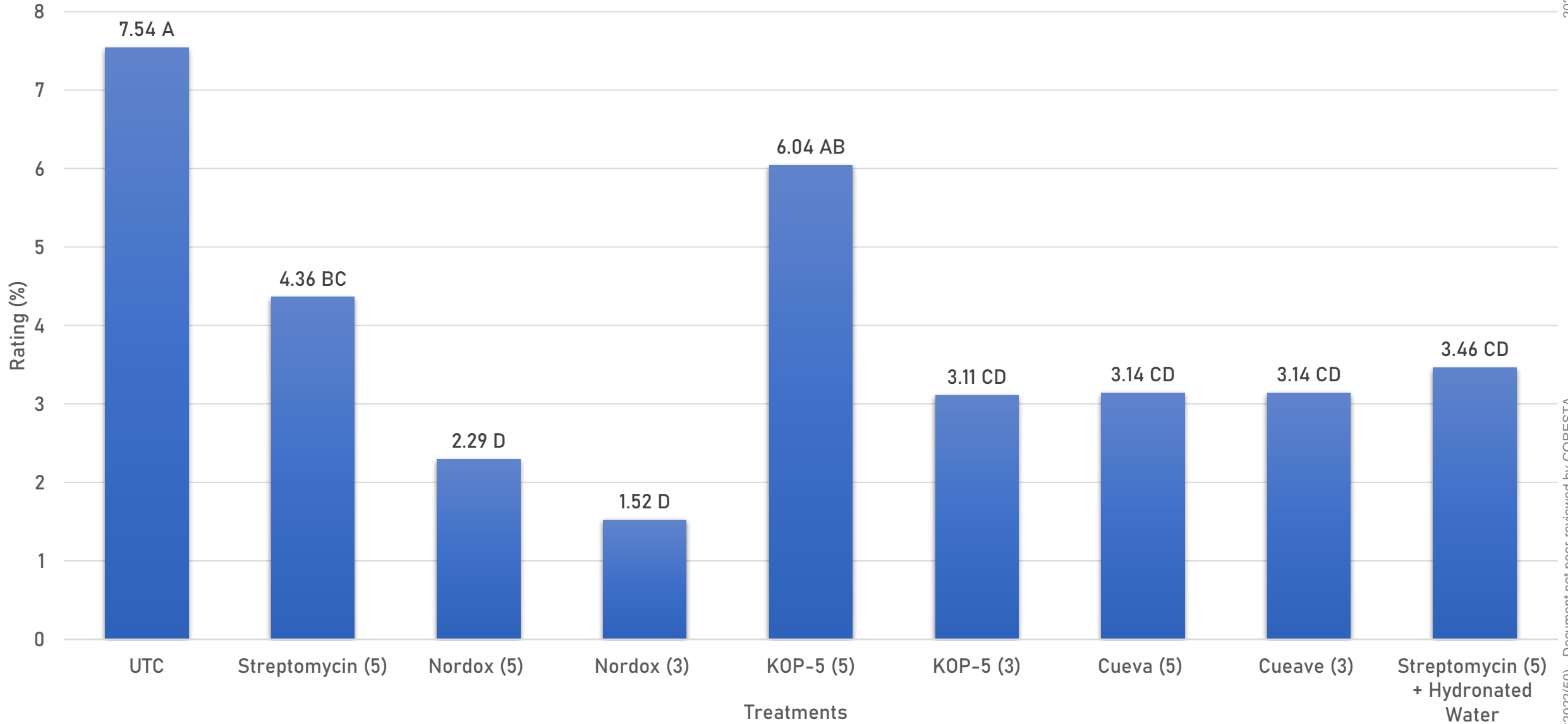
2021 Princeton Third Rating



2021 Murray First Rating



2021 Murray Second Rating



2021 Murray Third Rating

