



Interactions between herbicide mixtures and *Apera spica-venti* biotypes and their influence on herbicide efficacy



Gefördert durch:



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aufgrund eines Beschlusses
des Deutschen Bundestages

Introduction

Herbicide mixtures:

- Control of a wider range of weed species
- More effective control of a certain weed species

Present study:

- Control of *Apera spica-venti*:

pinoxaden + sulfonyleureas

Material and Methods

Interactions of herbicide mixtures

- Additive dose model (ADM)

→ Prediction of doses of any mixture of two herbicides leading to the same response level (e.g. ED90) based on the herbicides applied singly

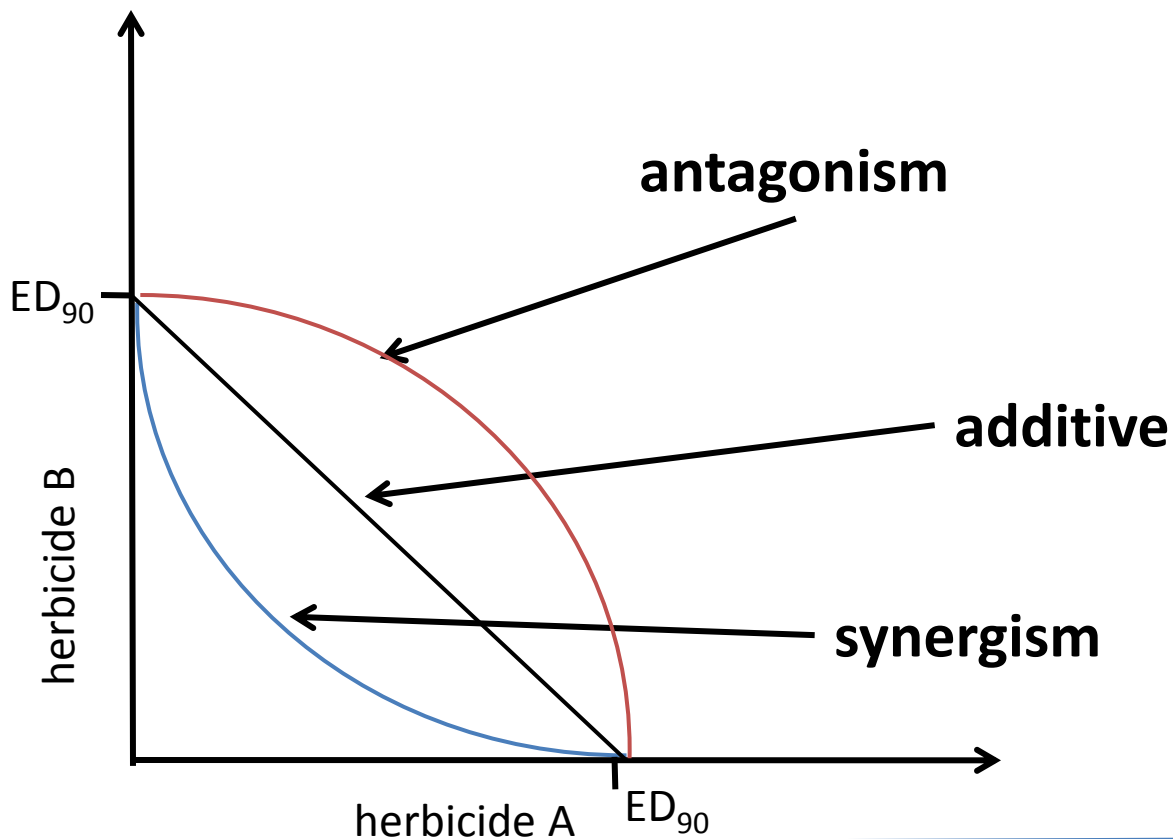
→ Comparison of predicted and observed values shows the kind of interaction between two herbicides

- additive = no influence between herbicides
- synergistic = herbicides influence each other positively
- antagonistic = herbicides influence each other negatively

Material and Methods

Interactions of herbicide mixtures

- Graphical illustration using isoboles



Material and Methods

Herbicide mixtures

- pinoxaden + metsulfuron & thifensulfuron
- pinoxaden + pyroxsulam
 - each herbicide applied singly
 - fixed ratios: 80:20; 60:40; 40:60; 20:80

***A. spica-venti* biotypes:**

- resistance to pinoxaden
- resistance to sulfonyleureas
- resistance to both herbicide groups
- no resistance

Material and Methods

A. spica-venti biotypes:

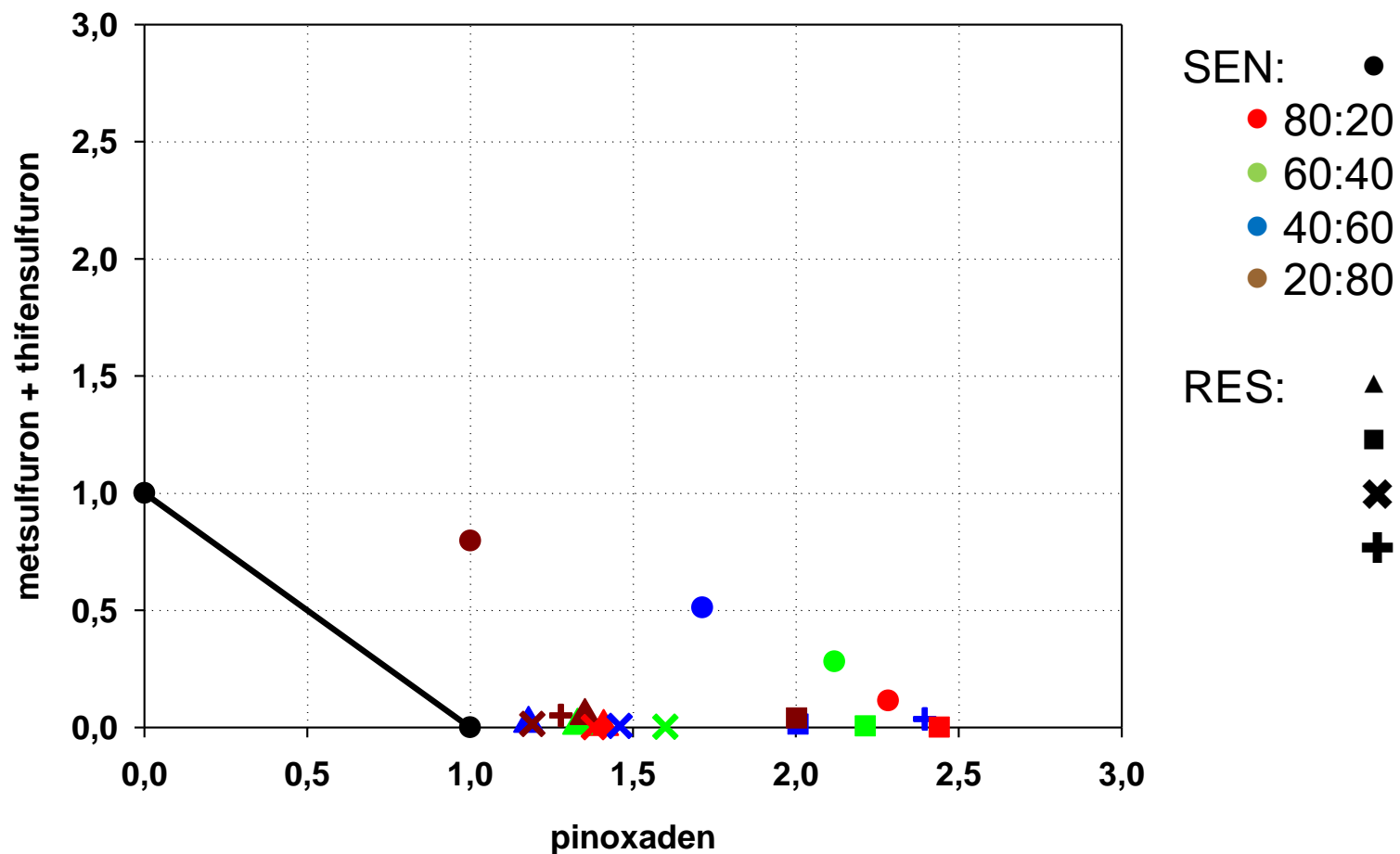
biotype	pinoxaden	met-&thifensulf.	pyroxsulam	
W11-024	S	S	S	
W11-111	S	S	S	
W09-157	S	R	R	sulfosulfuron- & IPU-resistance
W11-097	S	R	R	Pro197-TSR
W-879	S	R	R	NTSR (sulfonyureas)
W12-062	S	-	R	574-TSR
W10-046	S	R	S	light NTSR (sulfonylureas & IPU)
W-884	R	-	R	Pro197-TSR + NTSR (pinoxaden)
W12-033	R	-	S	NTSR (pinoxaden + iodosulfuron)
Selkant	R	-	S	ACC-ase-TSR

S = susceptible

R = resistant

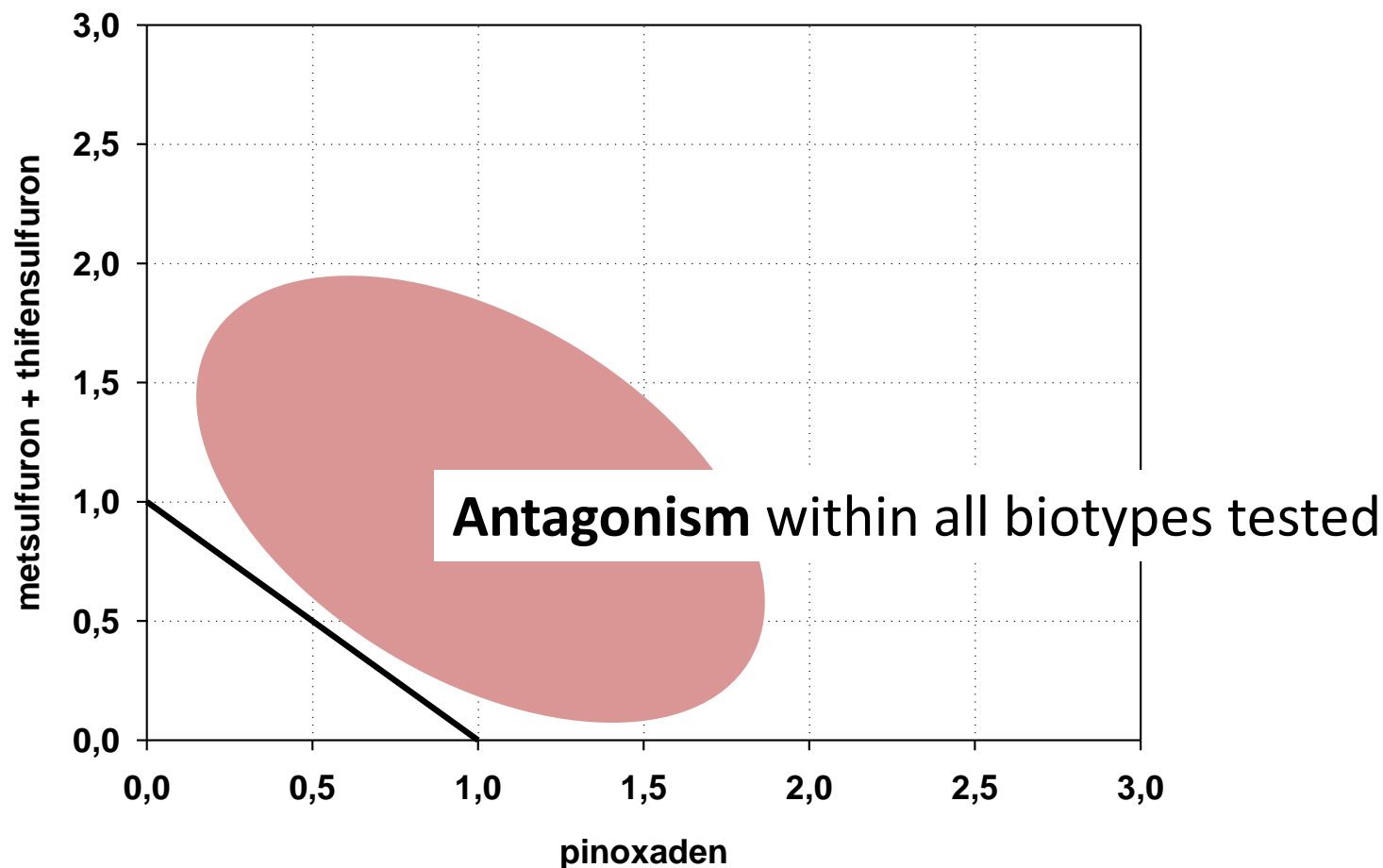
Results

Pinoxaden + Met- & Thifensulfuron



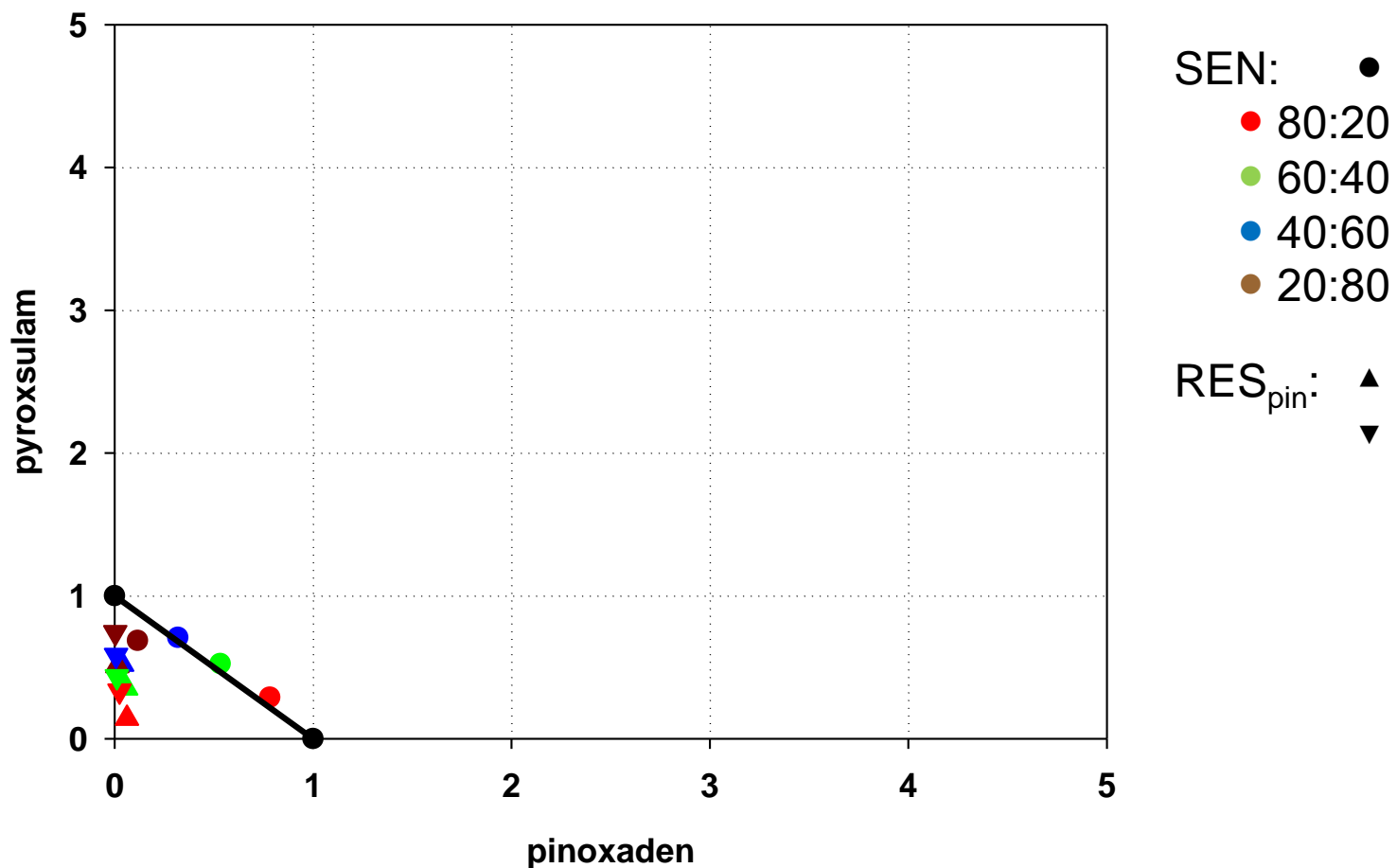
Results

Pinoxaden + Met- & Thifensulfuron



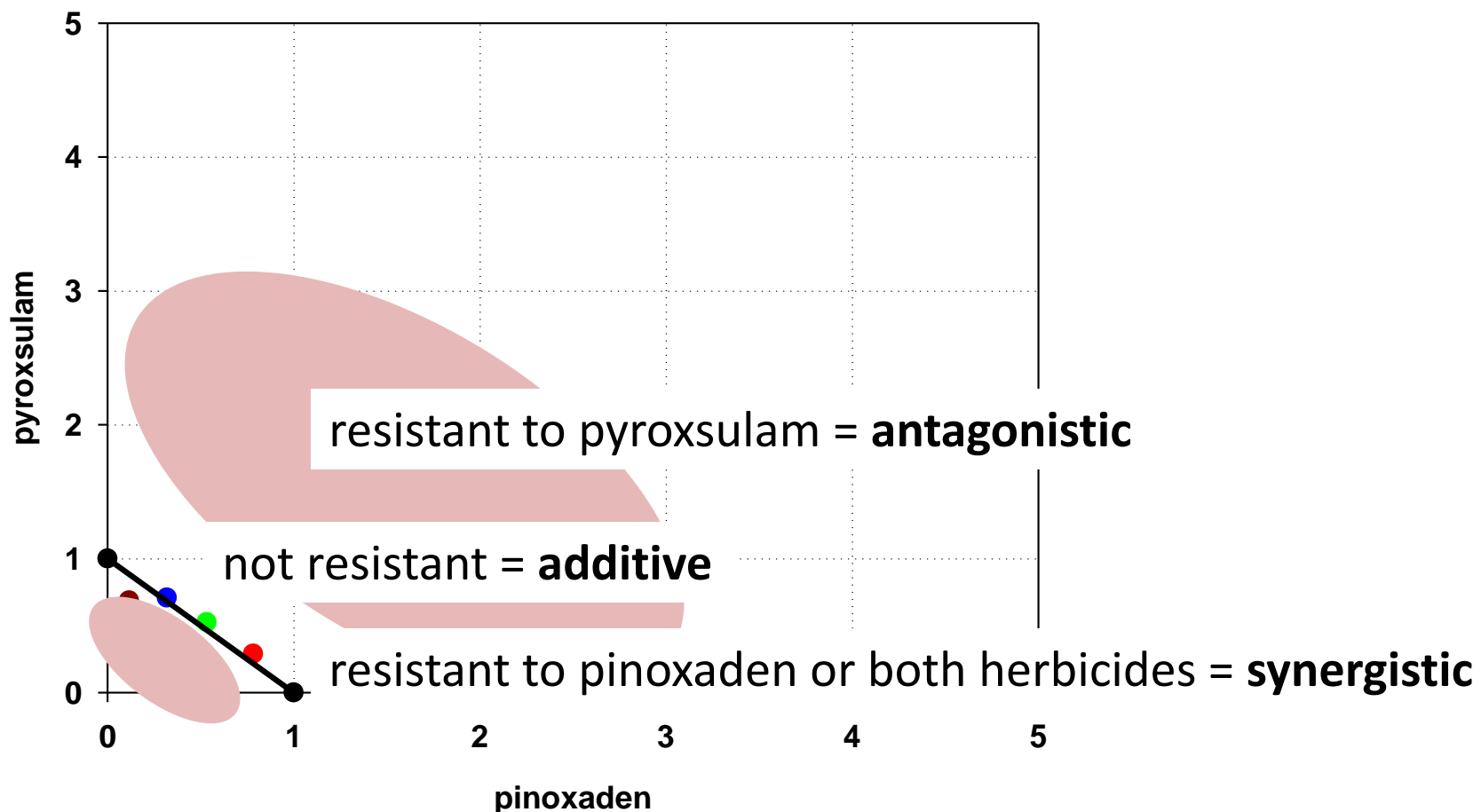
Results

Pinoxaden + Pyroxsulam



Results

Pinoxaden + Pyroxsulam



Summary

Trial results:

- Pinoxaden + Met- & Thifensulfuron:
 - Antagonism in all biotypes
- Pinoxaden + Pyroxsulam:
 - different kinds of interactions
 - depending on resistance-status of biotypes

Conclusion:

- no consistent interactions between mixtures of pinoxaden and sulfonylureas
- resistance may influence interactions of herbicides in tank mixtures **positively** as well as **negatively**

→ Knowledge about interactions between herbicide mixtures and resistant biotypes has to be improved to avoid resistance evolution!

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Thank you!

