FWC-Project Status Report

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Evaluating herbicides for activity on hydrilla and selectivity on non-target plants

Timeline

- 1985? Companies stopped aquatic screening
- 1978-99 Only fluridone registered
- 1995 Diquat, 2,4-D, copper, endothall, glyphosate, fluridone
- 2000 Fluridone resistant hydrilla
    - Whole lake treatments

Screening for new herbicides

Goal

- Register at least one product in as many MOA's as possible for resistance management

Considerations

- Evaluated
  - Mode of Action
  - Toxicity
  - Half-life
  - Degradation
  - Patent Date
- Informal Consultation
  - Registrant
  - FDACS
  - EPA

- If oz./acre Application Rates:
  - Evaluated- 0, 10, 20, 40, 80, 160, and 320 ppb
- If Pounds/acre Application Rates:
  - Evaluated – 0, 100, 200, 400, 800, 1600, and 3200 ppb

- Sand with Osmocote
- 3-5 Replications with 3-4, 2L pots
- 8 Weeks
  - Diquat- 100% Control
  - Fluridone- 60-70% Control

Objective 2000-2009

- To find rather slow acting, low dose, long contact enzyme inhibitors, selective, whole lake treatments.

Herbicide	MOA	Date	Comments
clethodim	accase	1987	results variable
diclofop	accase	1979	50% red at 200 ppb
fenoxaprop	accase	1982	no effect at 400 ppb
quizalofop	accase	1988	no effect to 800 ppb
sethoxydim (1)	accase	1978	no effect at <200 ppb
sethoxydim (2)	accase	1978	no effect at <800 ppb
tralkoxydim	accase	1986	50% red at 100 ppb

Herbicide	MOA	Date	Comments
bispyribac	als	1993	60% red at 50 ppb
clorimuron-ethyl	als	1986	60% red at 75 ppb
flucarbazone	als	1999	no effect at 400 ppb
halosulfuron-methyl	als	1991	no effect at <200 ppb
imazamethabenz	als	1981	no effect at <200 ppb
imazamox	als	1991	50% red at 100 ppb
imazapic	als	1981	no effect at <500 ppb
imazapyr	als	1981	no effect at <5,000 ppb
imazethapyr	als	1987	no effect at <400 ppb
imazosulfuron	als	1997	no effect at <200 ppb
metulfuron-methyl	als	1983	40% red at 100 ppb
nicosulfuron	als	1991	50% red at 100 ppb
penoxsulam	als	2000	60% red at 50 ppb
rimsulfuron	als	1989	50% red at 100 ppb
sulfometuron-methyl	als	1984	50% red at 100 ppb
trifloxysulfuron	als	1999	80% red at 50 ppb
trifloxysulfuron	als	1999	60% red at 50 ppb

Herbicide	MOA	Date	Comments
fluridone	carotenoid	1978	50% red at 25 ppb
flurtamone	carotenoid	1987	60% red at 200 ppb
isoxaflutole	carotenoid	2003	40% red at 200 ppb
mesotrione	carotenoid	2001	75% red at 50 ppb
norflurazon	carotenoid	1968	40% red at 100 ppb
topramezone	carotenoid	2004	80% red at 40 ppb

Summary

- Carfentrazone – 2004
- Penoxsulam – 2007
- Imazamox – 2008
- Flumioxazin – 2010
- Bispyribac – 2011
- Topramezone – 2013

4 EUP's 2010-2012

- Topramezone
- Quinclorac
- Mesotrione
- Trifloxy

Mission Accomplished

- Penoxsulam ALS
- Bispyribac ALS
- Topramezone HPPD
- Fluridone (sus) PDS

Who changed the rules?

Objective:

To register (find) a fast acting contact herbicide to alternate with endothall

Herbicide	MOA	Date	Comments
acetochlor	mitosis	1986	25% red at 200 ppb
alachlor	mitosis	1966	20% red at 200 ppb
dimethenamid	mitosis	1993	no effect at <400 ppb
metolachlor	mitosis	1974	50% red at 200 ppb
oryzalin	mitotic	1969	no effect at <200 ppb
acifluorfen	ppo	1981	field tested at 400 ppb
flufenpyr-ethyl	ppo	n/a	50% red at 400 ppb
flumioxazin	ppo	1989	75% red at 100 ppb
fomesafen	ppo	1983	no effect at <400 ppb
lactofen	ppo	1991	60% red at 100 ppb
oxadiazon	ppo	1969	no effect at <400 ppb
oxyfluorfen	ppo	1975	60% red at 50 ppb
pyraflufen-ethyl	ppo	1993	no effect to 800 ppb
saflufenicil	ppo	2000	no effect at 400 ppb
sulfentrazone	ppo	1991	40% red at 200 ppb

PPO Information

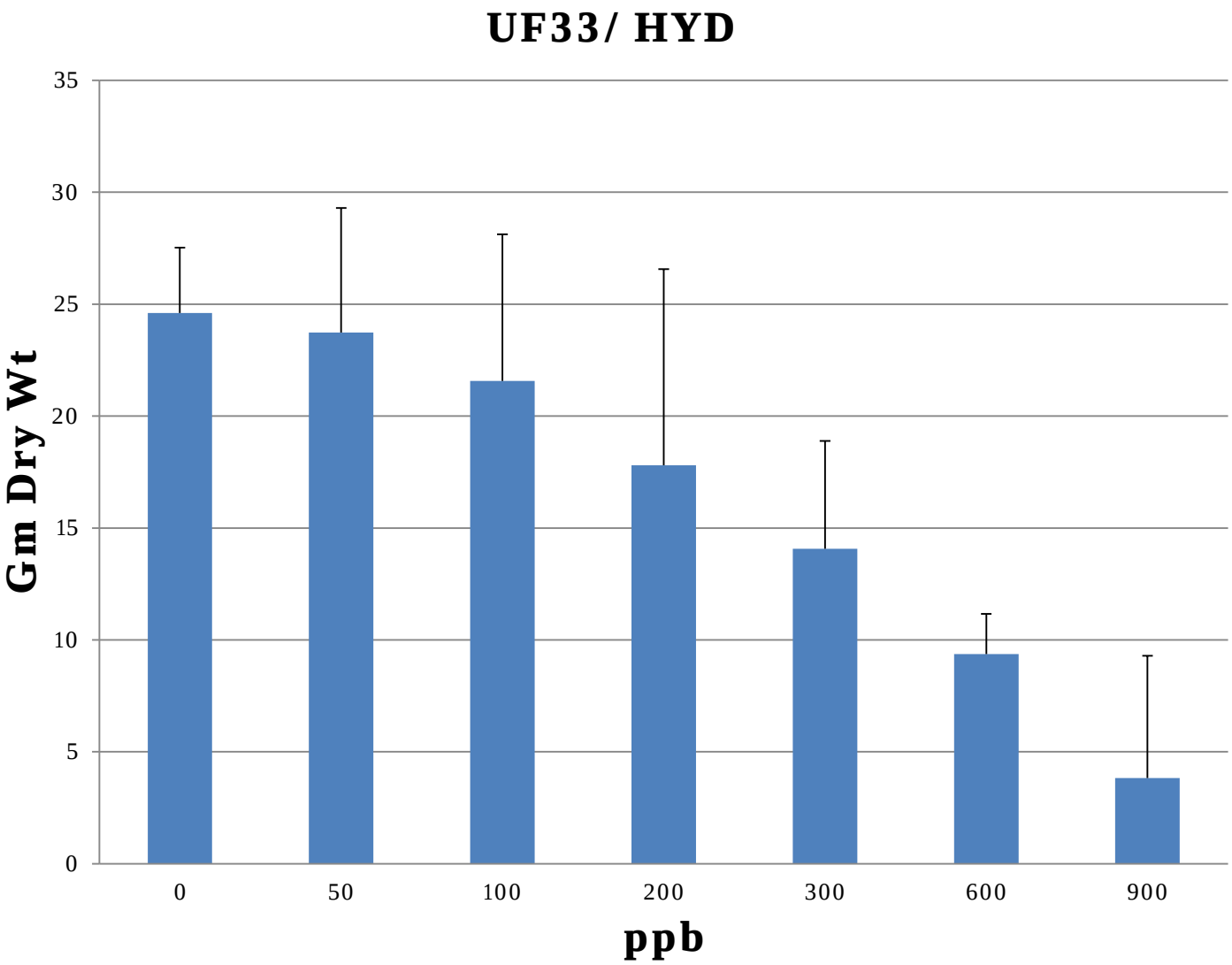
Aciflurofen	Field tested at 400 ppb
Azafenadin	Rapid photolysis
Bifenox	Toxic at 480 ppb
Butafenacil	Rapid Microbial
Carfentrazone	Stingray
Flufenpyr	50% reduction at 400 ppb

PPO Information

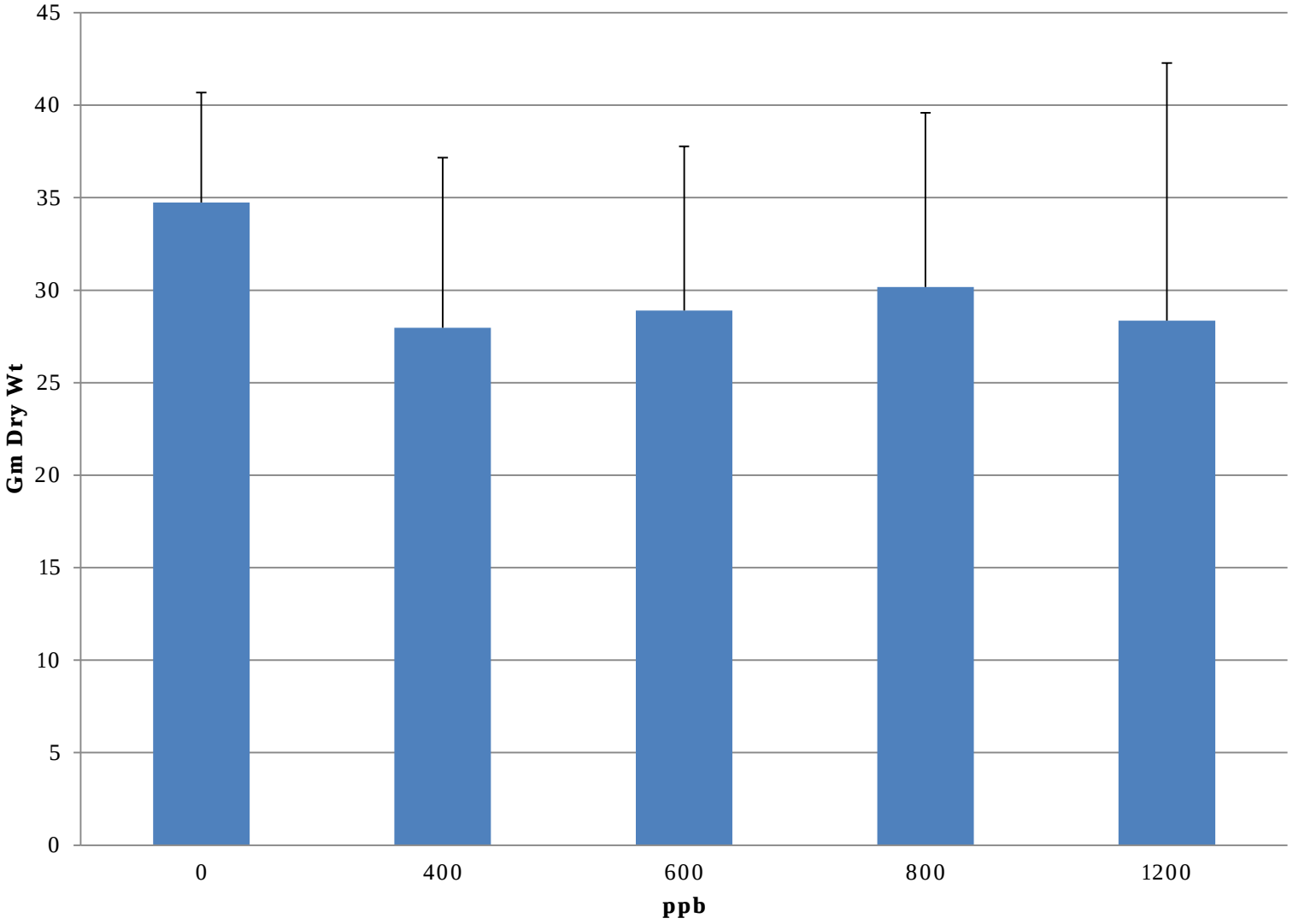
Flumiclorac	No effect < 800 ppb
Flumioxazin	Clipper
Fluroglycofen	Rapid photolysis
Fluthiacet	Toxic at 140 ppb
Formesafen	No effect < 400 ppb
Lactofen	60% reduction at 100 ppb Toxic at 490 ppb

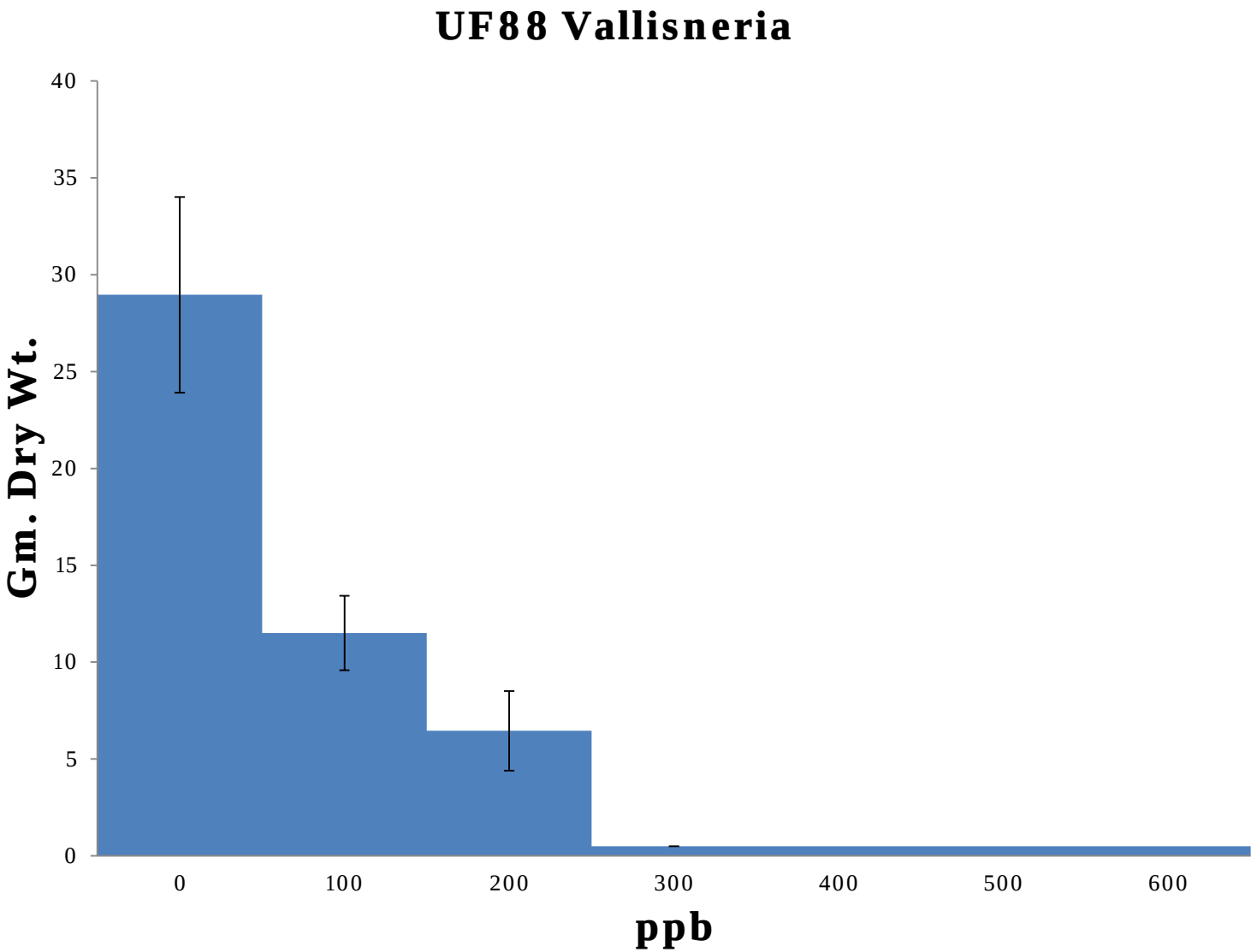
PPO Information

Oxadiargyl	Toxic < 370 ppb
Oxadiazon	No effect < 400ppb
Oxyfluorfen	60% reduction at 50 ppb Toxic at 32 ppb
Pyraflufen	No effect < 800 ppb
Saflufencil	No effect < 400 ppb
Sulfentrazone	40 reduction at 200 ppb


UF33/ HYD
Gm Dry Wt
35
30
25
20
15
10
5
0
0
50
100
200
300
600
900
ppb

UF53/ HYD




UF88 Vallisneria
Gm. Dry Wt.
40
35
30
25
20
15
10
5
0
0
100
200
300
400
500
600
ppb

Good News

- No EUP's
- Can test 1 acre
- More Numbered
- On patent
- Likely registration
- 2 look good

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