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Integrating mowing as a weed management tool for control of *Ambrosia artemisiifolia* in carrots

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Problematics of weed control in carrots

- Carrot production mainly in organic soil (~85%OM)
- *Ambrosia artemisiifolia* L. (common ragweed)
 - most important weed difficult to control
- Linuron - only herbicide registered for last 30 years
- First report of linuron resistance in ragweed in Canada



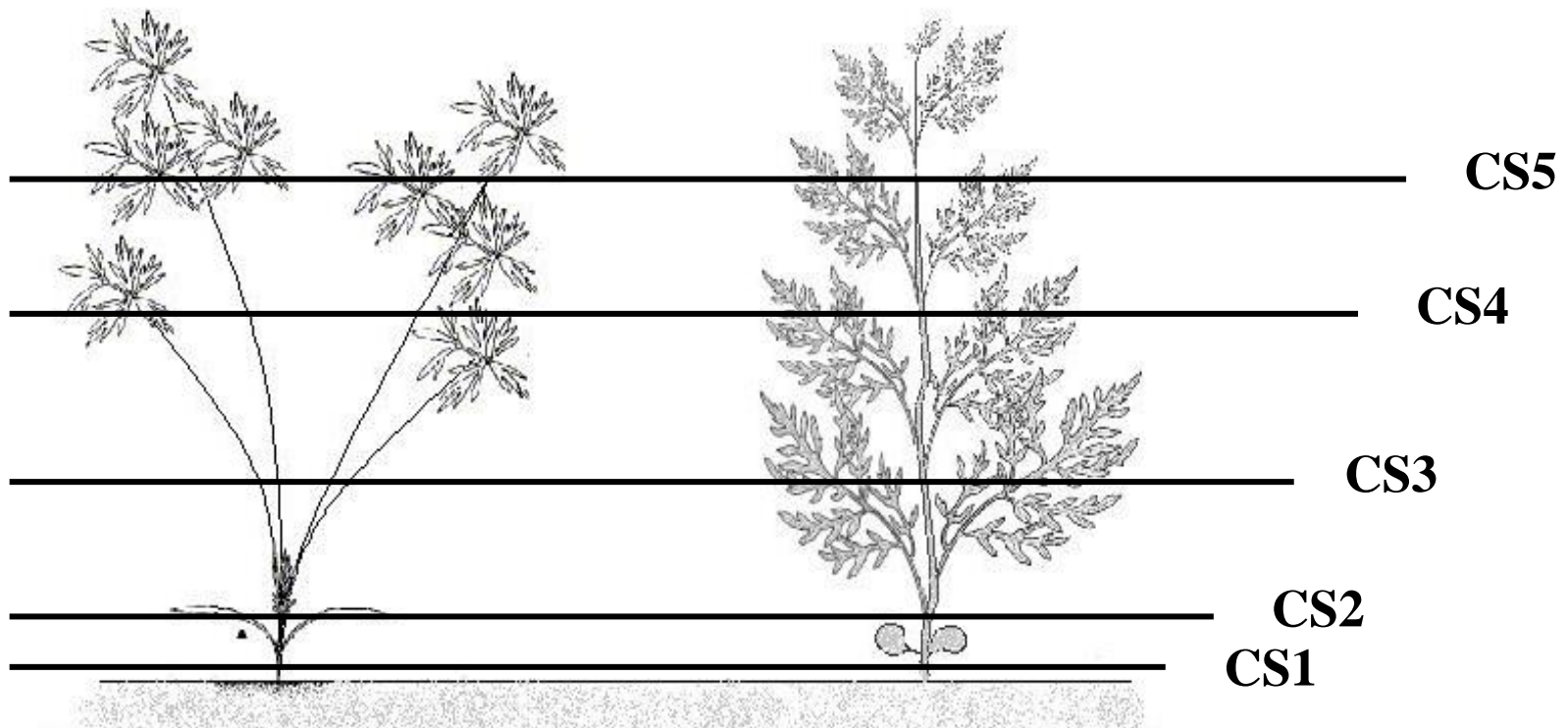
Morphological difference between carrot and *A. artemisiifolia*



Alternative approach:

CARROT

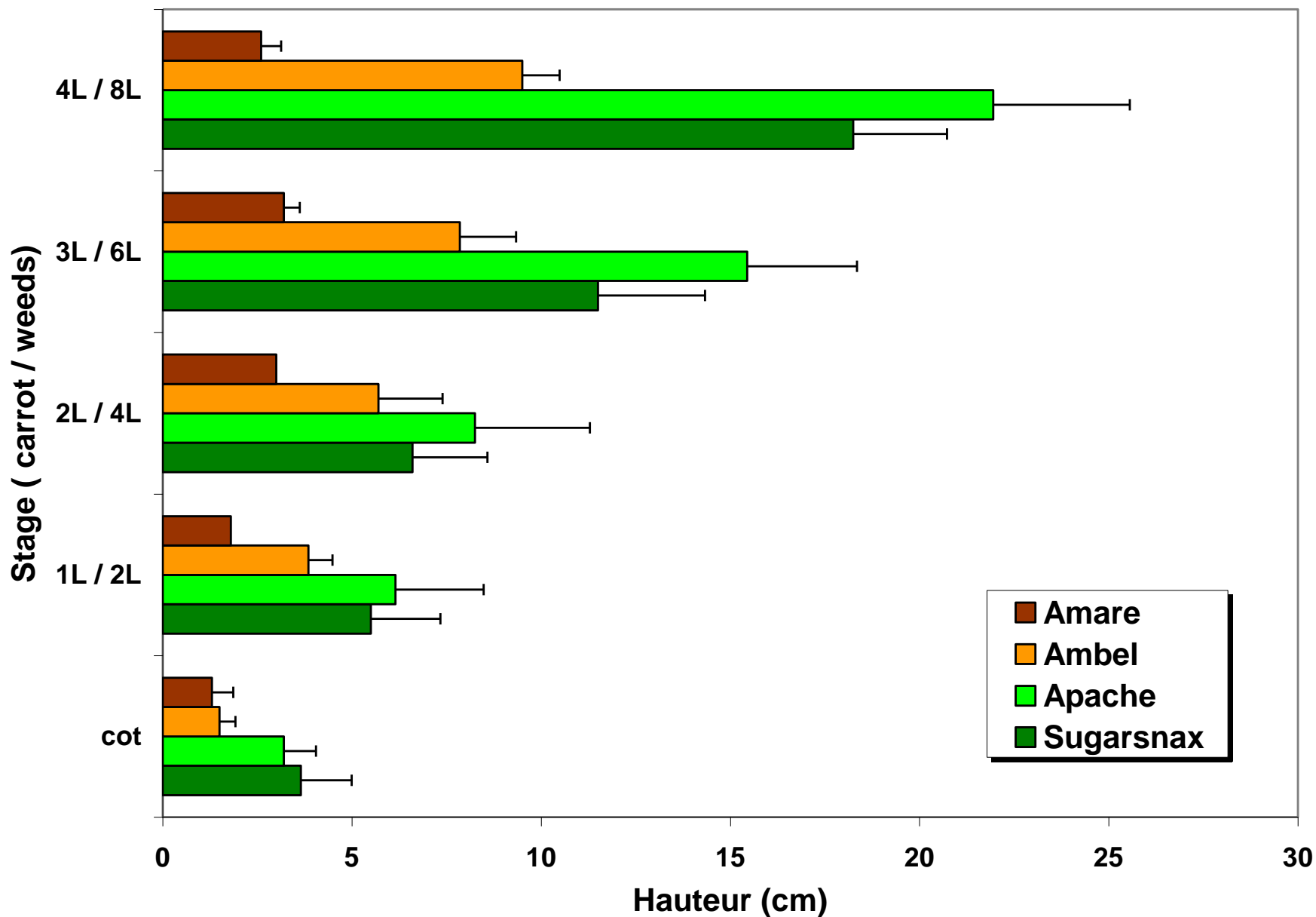
WEED



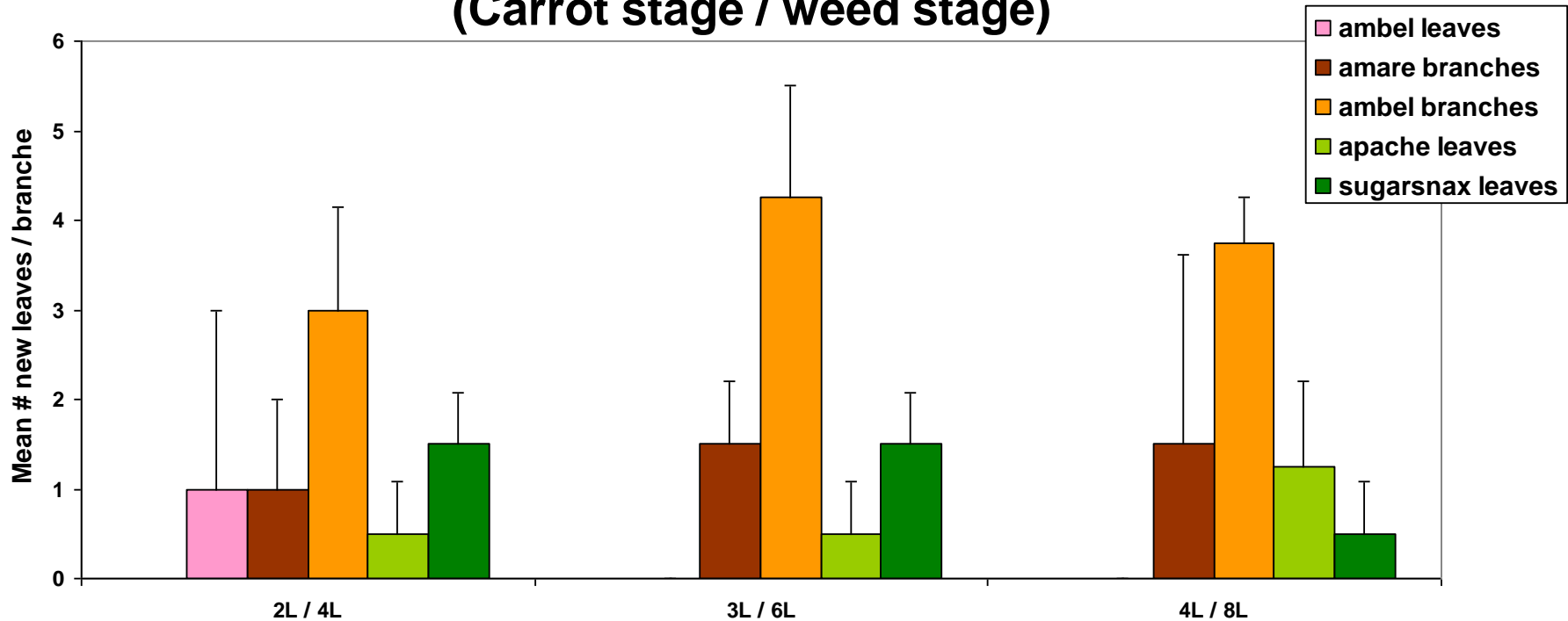
Experimental protocol - Growth cabinet

- CR design with 2 replicates
 - 25 C day and 15 C night
 - photoperiod of 16 hr day and 8 hr night
 - 6 seedlings per pot
- Weeds species – AMBEL & AMARE
- Carrot cultivars – SugarSnax & Apache
- Parameters measured
 - plant height (before & after cut)
 - Cutting height
 - Number of leaves and branches (7 d interval after cut)

Height vs Stage (carrot / weeds) - Control



Regrowth following cutting at 1st internode (CS3) (Carrot stage / weed stage)



Growth stage at cutting

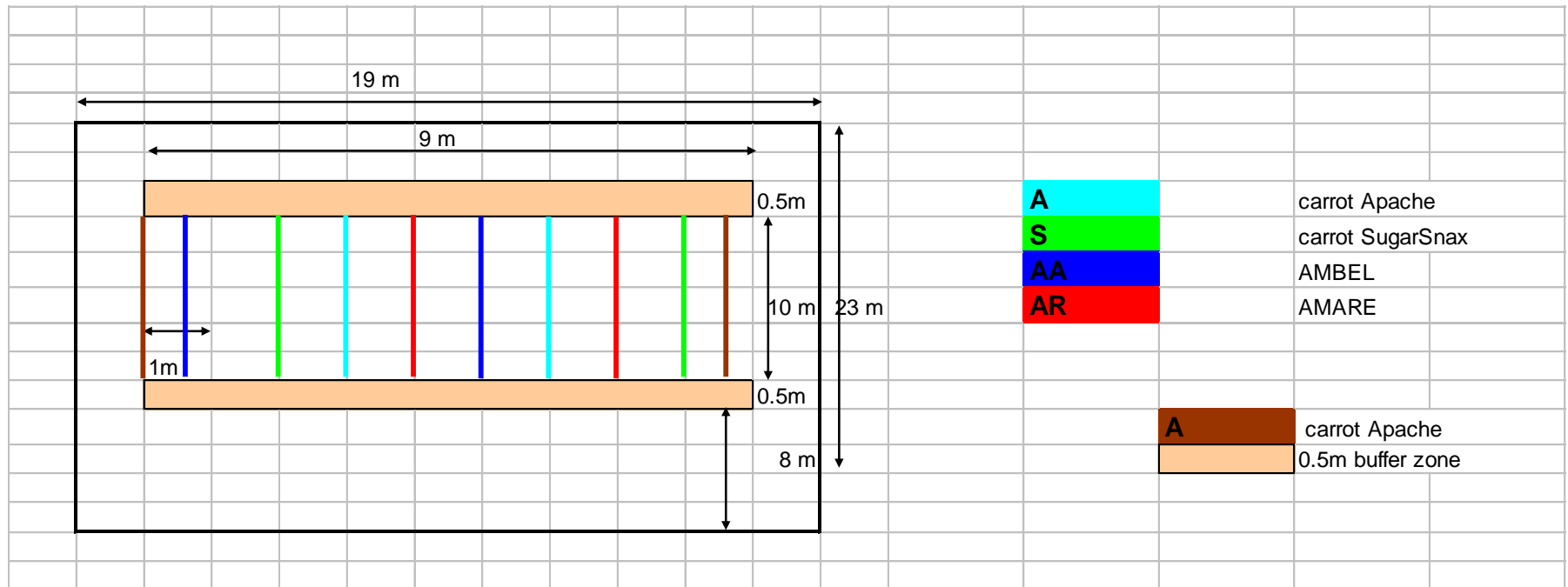


Summary: Growth cabinet experiment

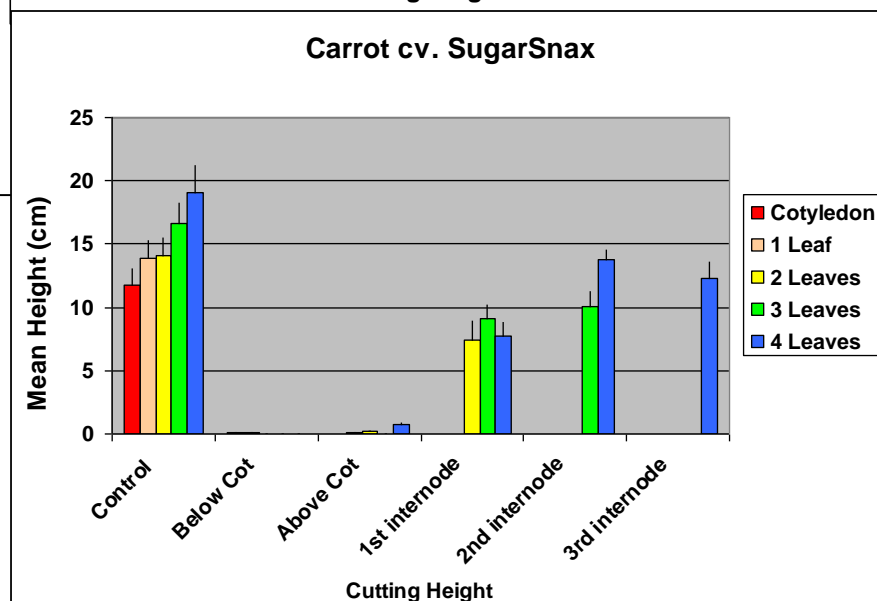
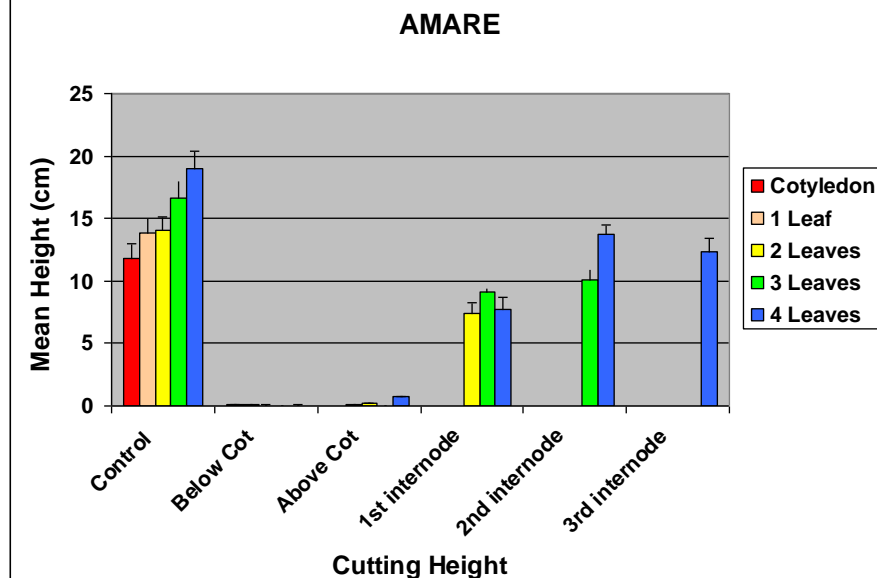
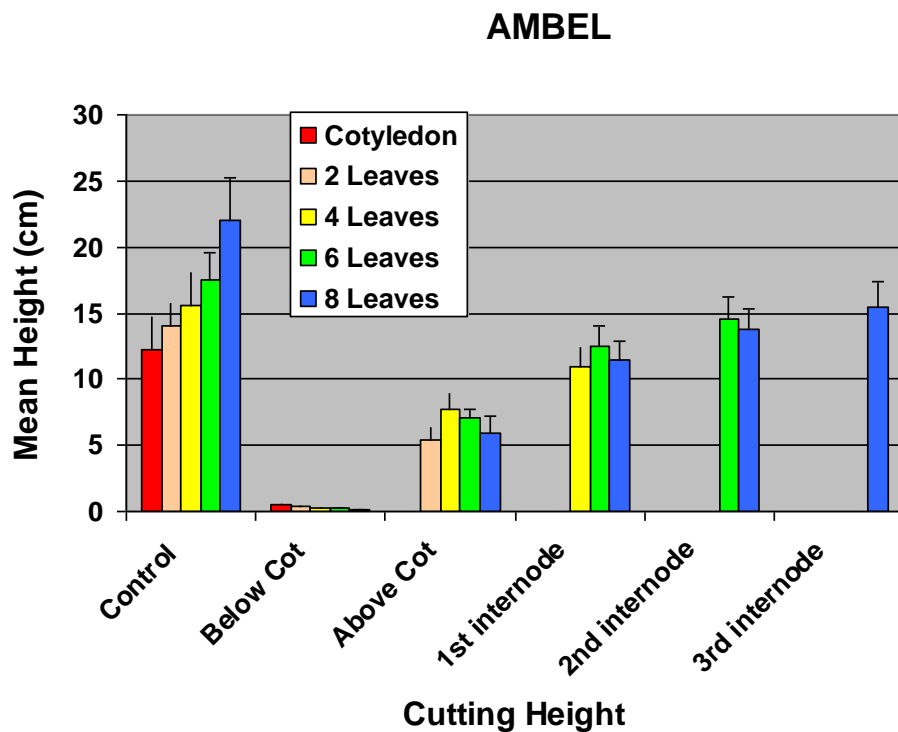
- rapidity of phenological development :
AMARE > AMBEL > > carrots w Sugarsnax > Apache
- Cv. Apache was taller & produced more leaves than SugarSnax
- Cutting above the 1st internode stimulated branching to a greater extent in AMBEL than in AMARE.
- Selective mowing could be done minimally at the 6 leaves stage of AMBEL and AMARE, approximately 27 days after seeding when carrots are at 1 to 2 leaves stage and 6-7cm in height.

Experimental protocol - Field experiment

- CR design with 2 replicates
 - 1 row/species
 - 10 cm between individuals & 1 m between rows
 - Monitored 4 contiguous seedlings at each stage & cutting height
- Parameters measured:
 - plant height (before & after cut) ; Cutting height
 - Number of leaves and branches (7 d interval after cut)

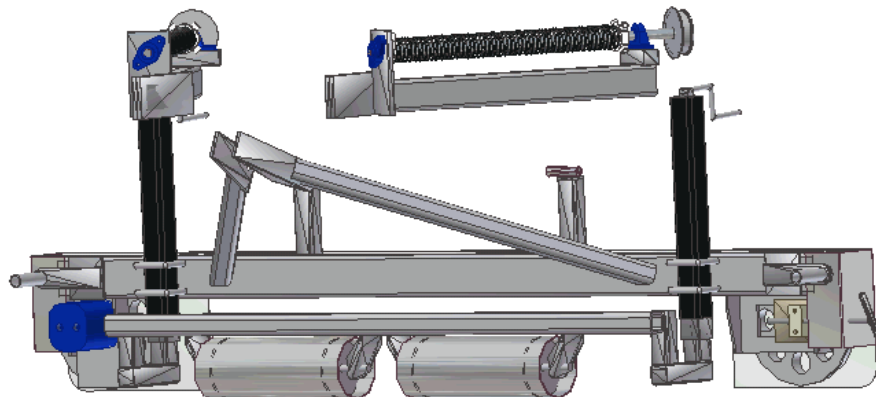


Cutting Effect on Regrowth



Mowing experiment

- CRB design with 4 replicates
 - Cutting at 2L, 3L, 4L stage of carrots
 - Monitored AMBEL & AMARE
 - on the row
 - between rows
- Parameters measured:
 - plant height
 - before & after cut
 - Cutting height

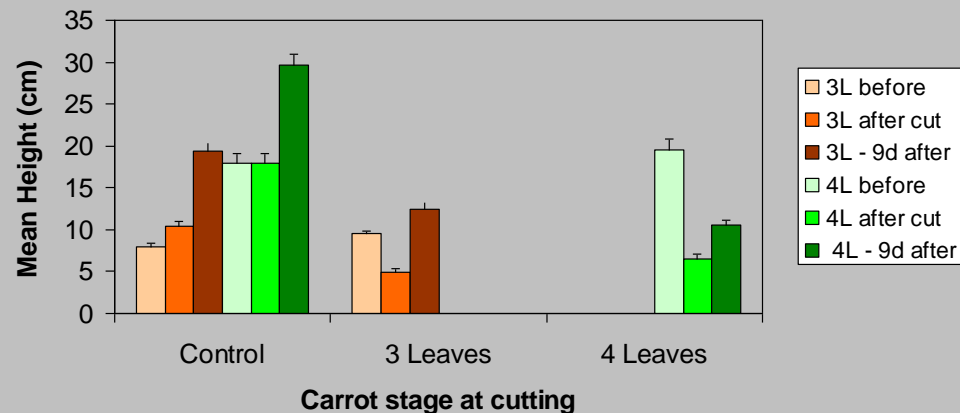


Mowing Unit

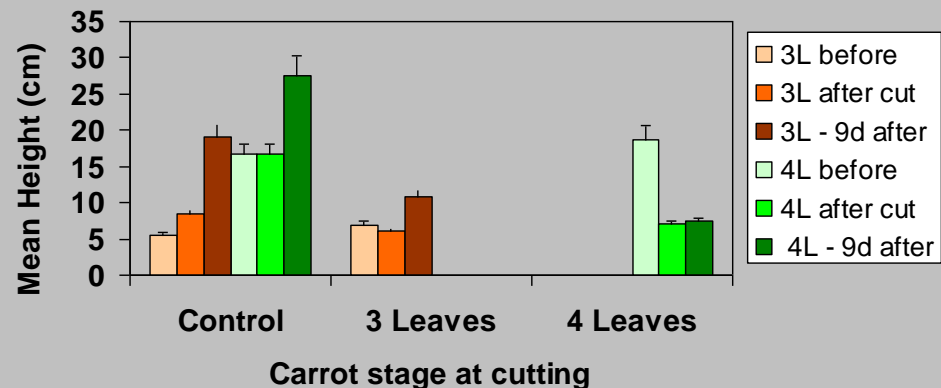


Mowing Unit Impact on Regrowth

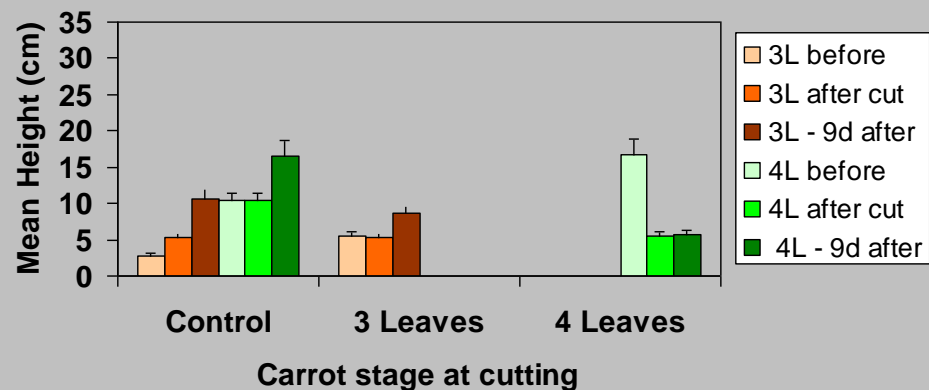
Carrot height



AMBEL Height



AMARE Height



Cutting at 3L:

AMBEL – BBCH 13

AMARE – BBCH 16

Cutting at 4L:

AMBEL – BBCH 14

AMARE – BBCH 17

Conclusion

- Cutting has a greater growth repression on AMARE than AMBEL
- AMBEL was stimulated to a greater extent than AMARE or carrots
- Cutting at carrot 3 leaves stage has a greater stimulatory effect on all species than cutting at carrot 4 leaves stage
- Mowing should be done at the 4 leaves stage of carrots
- Additional control for weed regrowth in between rows is necessary to give competitive advantage to carrots





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