Yield losses in vegetable & arable crops caused by *Cyperus esculentus* in farmers' fields in Switzerland

R. Total[1], L. Collet[2], J. Heyer[2], M. Keller[1]
[1] Agroscope , Wädenswil; www.agroscope.ch, [2] Grangeneuve, Switzerland

Background

- Yellow nutsedge (*Cyperus esculentus*) is a serious weed worldwide. In Switzerland, it is present in all arable and vegetable producing regions.
- Yield loss data from abroad, mainly from Northern America, shows the detrimental effect of *C. esculentus* on crop production. In contrast, yield loss data determined under European condition is scarce (Follak et al., 2016[1]).

➢ **To close this data gap, we determined yield losses due to *C. esculentus* in different crops and in different years in farmers' fields in Switzerland.**

Material & Methods

Yield losses caused by *C. esculentus* were determined in Swiss fields (2013-2016). Standard, intensive weed control had been carried out in the sampled fields. Per field, yield samples from non infested areas and from patches with high *C. esculentus* coverage were taken & yield loss was calculated. For onion and carrot, *C. esculentus* infestation levels varied within the field. Thus a non-linear yield loss curve could be fitted to the data (drc package in R, Ritz et al. 2015[2]).

Results

- High *C. esculentus* infestation levels of 40-100 % coverage resulted in high yield losses (Tab1, Fig1 & 2).
- Qualitative losses were observed in leek and brussel sprouts, which were not marketable.
- *C. esculentus* rhizomes can penetrate carrots and potatoes and even produce tubers in potatoes (Fig3).

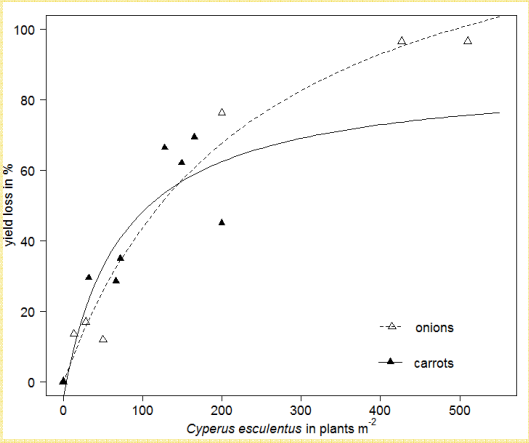

Fig 1: Yield loss caused by *C. esculentus* in carrots and summer onions (2015).

Fig 2: Sugar beet with (left) & without (right) *C. esculentus* interference

Tab 1: Yield losses caused by *C. esculentus* in crops.

crop	year	coverage [%]	yield loss [%]
Potato	2013	47	39
	2014	40	28
Sugar beet	2013	77	62
	2014	58	71
Leek	2014	100	86
Brussels sprouts	2016	40	62
		80-90	93

Conclusion & Outlook

➢ High yield losses occur in field areas with high *C. esculentus* infestation levels.
➢ The observed yield losses occurred despite intensive weed control.
➢ Determined yield losses were similar to or higher than the values reported in the literature.
➢ Recent yield loss data is much better suited to raise awareness of farmers, as it is perceived relevant to their own situation.
➢ The gathered data is employed for further training of farmers. It is presented here to make it available to European colleagues facing the same problem.

Fig 3: Rhizomes penetrating carrots & tuber formed in potatoes.

[1] FOLLAK, ET AL., 2016: Biological flora of Central Europe: *Cyperus esculentus* L. Perspectives in Plant Ecology, Evolution and Systematics **23**, 33-51
[2] RITZ, C., F. BATY, J.C. STREIBIG and D. GERHARD, 2015: Dose-Response Analysis Using R. PLOS ONE, **10**.