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Impact of intensification factors on the economics in dairy sheep

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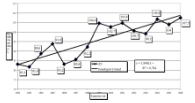
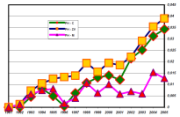
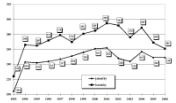
Background & The aim of the study

Sheep in Central and Eastern Europe in last decades

= changes in: production focus
genetic potencial
modernisation
nutrition & professional skills
…







Productivity of breeds and conditions **= extensive**

What about **intensification** to: increase **production**?
improve utilisation of **costs**?
reach **efficiency**?

The aim of the study:
comprehensive **analyse** of some **intensification factors**
on the **economics of** Improved Valachian breed

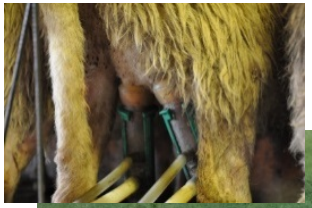
Source of figures: Margetin et al. (2006)

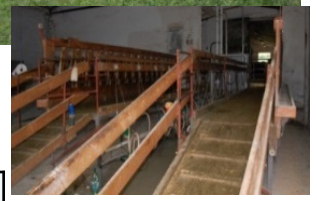
Material & Methods (1)

Improved Valachian breed

(base system)

- a multi purpose sheep (milk-meat-wool)
- semi-extensive „Carpathian“ system
- pasture in summer; housed in winter
- 40% of milk is processed to cheese
- ewe lambs mated at age 1.5 year; natural mating

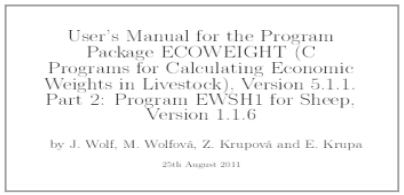




Parameter (unit)	**Base system**	**Intensification factor**
Season of lambing	Seasonal (winter)	Out-off seasonal (autumn)
Weaning of lambs	Customary (50d)	Early (5d) & sales
		Early (5d) & rearing
Production level	Population average:	Breeding goal:
milk yield (kg/ewe/150d milking period; /MP in total)	100 (124)	130 (160)
litter size (lambs/lambing)	1.21	1.55
conception rate of ewes (%)	84	95
live weight of ewe and ram (kg)	50 / 75	60 / 85
ADG of lambs till weaning (g/d ♀ and ♂)	0.200 / 0.220	0.290 / 0.330

+25%

Material & Methods (2)


User's Manual for the Program Package ECOWEIGHT (C Programs for Calculating Economic Weights in Livestock), Version 5.1.1. Part 2: Program EWSH1 for Sheep, Version 1.1.6

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25th August 2011

Economic evaluation:

✓ **bio-economic model** ECOWEIGHT, Program for Sheep (Wolf et al., 2011)

Production
Reproduction
Nutrition

Costs & Revenues

Modelling / simulation of the system

Production and economical data of categories & flock
Profit (€ per ewe and year)
Profitability ratio (%) = effectiveness of expended cost in the flock

Σ **600** inputs

Σ **1200** outputs

Approaches:

Markov chain

Wood function + RC and LS

van Slyke function (cheese)

growth curve + gender, LS, genotype

nutrient and feed requirement

milk and lamb price on quality

$$TE = nstgE(LL-1) + nstg1E = 5(LL-1) + 3$$

$$y(t) = at^b e^{-ct}$$

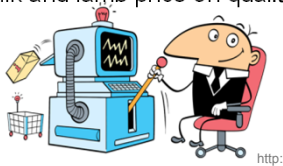
$$prmilk = prmilkb + \sum_{i=1}^{nfat+1} F_i + \sum_{i=1}^{nprot+1} P_i$$

$$cheesey = \frac{(rfat \times fat + rcas \times casprot \times prot) \times r8}{100 - moich}$$

$$IAE[i] = \begin{cases} \sum_{j=1}^{nstgE} IIE[(i-1) \times nstgE + j] & \text{for } i = 1, \ldots, LL-1 \\ \sum_{j=1}^{nstgE} IIE[(i-1) \times nstgE + j] & \text{for } i = LL \end{cases}$$

$$negE[i][k][l] = adgE \sum_{t=k1}^{k2} \delta_t \times \left(2.1 + 0.45 \times (wlE[1] + adgE \times t)\right)$$

$$pr_i = prbase_i \sum_{j=1}^{nrt} \sum_{k=1}^{nrC} k_{ijk} P_{ijk}$$


http://inited.cz

Results (1)

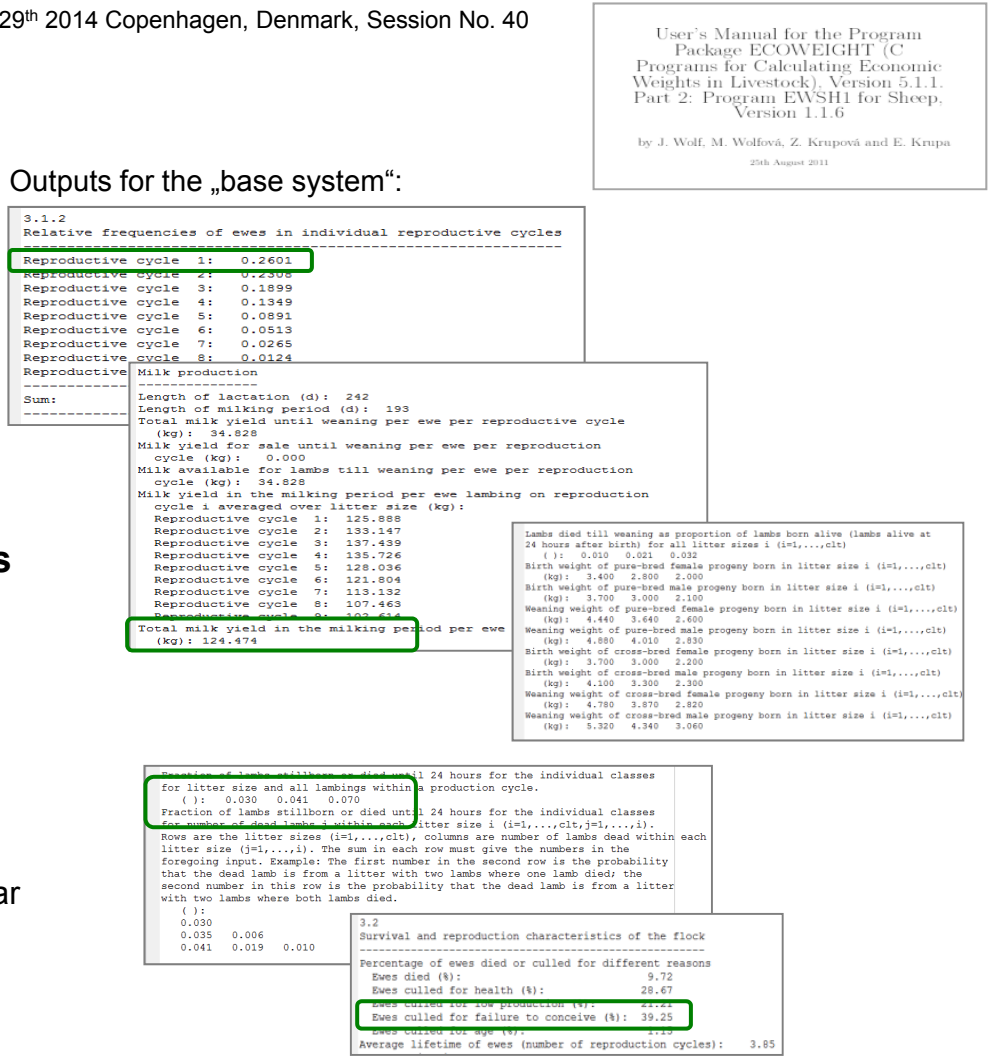
Impact on the flock production:

1. **Out-off seasonal lambing**
   - Conception rate of ewes -10 p.p.,
   - Ewes at first lambing 26% → 30%
   - Average milk yield per ewe -17%

2. **Early weaning + sale / + rearing of lambs**
   - Milk yield per milking period +26%

3. **Breeding goal**
   - Ewes at first lambing 26% → 22%
   - Average lifetime of ewes 4 → 5 years
   - Lamb production 11 kg → 21 kg/ewe/year

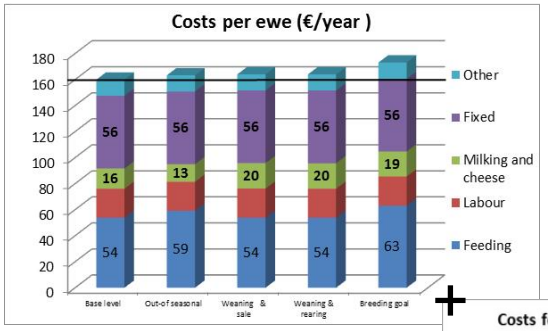
Outputs for the „base system“:



Results (2)

Impact on the economics:

1. Cost



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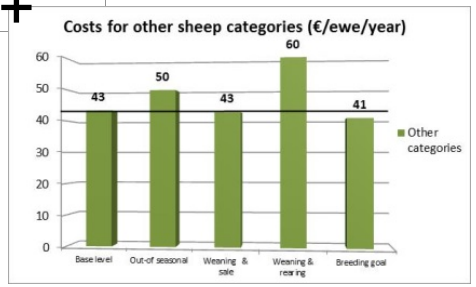
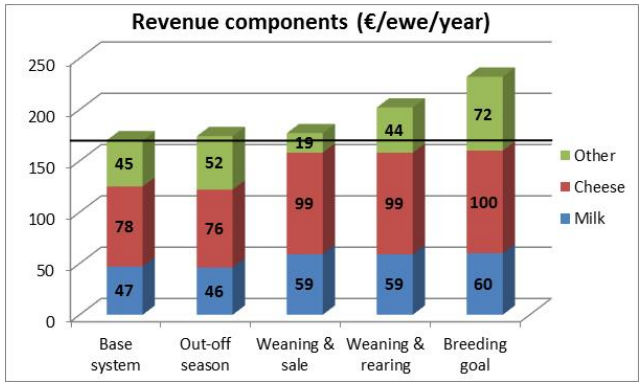


- Costs per ewe and year without dramatic change (+2% to +8%)
- Feeding and fixed costs the most important items (35% for both)
- Costs for other categories +15% (out-off seas.) and +38% (early w.& rearing)
- Total costs per ewe and year +2% to +10%

2. Revenue



- Total revenue per ewe and year +2% to +36%
- Milk and cheese - the most important resources (70% to 90%)
- Lambs = 30%, when higher reproduction and growth intensity

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Results (3)

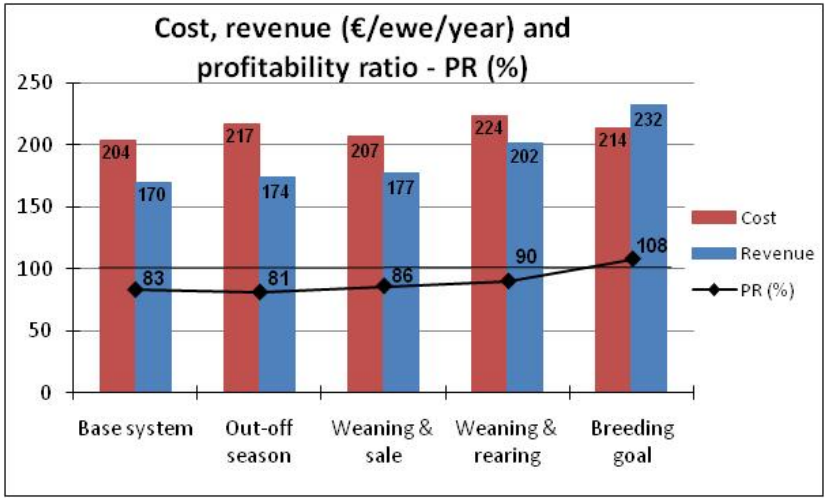
Impact on the economics:

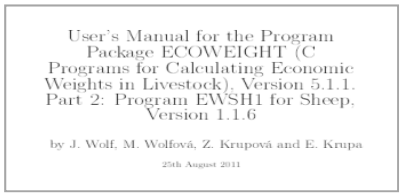
3. Profit and profitability ratio (PR)

- **No subsidies** when profit calculation
- Positive profit for „**breeding goal**“: PR = 108%
- „**Out-off seasonal**“ lambing: PR = 81%
  - ✓ for the whole flock
  - ✓ combination of seasons

→ good premise for PR ≥ 100%

- „**Early weaning of lambs**“ PR 86% and 90%

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Conclusions

Intensification factors in semi-extensive system:

Economical and practical points of view

- ✓ **Positive impact** on the **economics and on the costs utilisation**

  + existence of **reserves** in the costs effectiveness in „base system“

- ✓ Some aspects for practical application:
  - ✓ consider the **individual farm conditions** (nutrition, biology, technology, labour ...)
  - ✓ more intensive breeding process, central nurseries
  - ✓ grants/support for investment and time for realisation
  - ✓ future: **socio-economic** and **environmental** impact

    (i.e. legislative for the emission production)
  - ✓ ...

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