Quality parameters of walnut (*Juglans regia* L.) fruits from Kyrgyzstan as affected by abiotic properties and intraspecific variability

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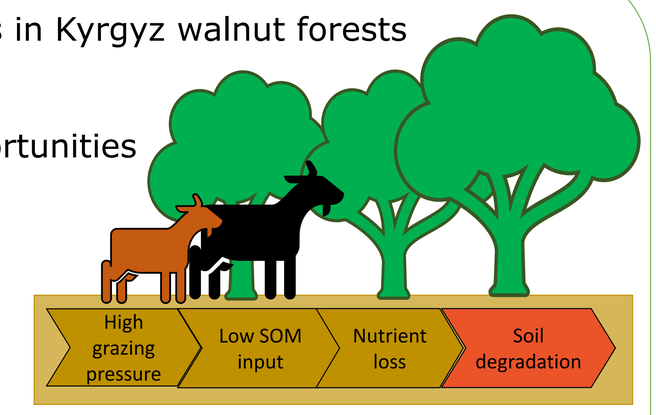
Background & Research Questions

- Unique diversity of walnut fruits in Kyrgyz walnut forests
- Lack of alternative income opportunities
  → overexploitation
  → degradation of forests
- Adding value:
  → walnut fruit quality has hardly been investigated in the context of abiotic factors & genetic variability



1. How do physical and biochemical nut quality parameters compare internationally?
2. To what extend do site factors and intraspecific variability influence nut quality?
3. How do results of the present study refer to forest management?

Results

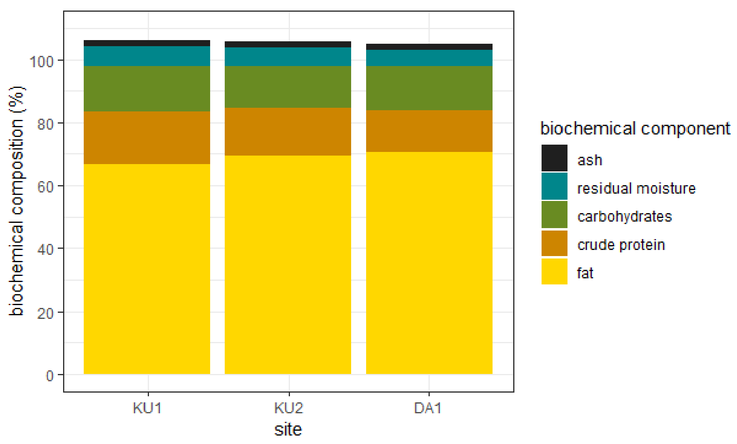


Figure 1: Biochemical composition [%] of the total weight of wild *Juglans regia* from Bazar-Korgon, Kyrgyzstan

Mean values in % of the total weight; n = 5 trees per sampling site KU1, KU2, DA1; subsamples of 25 nut kernels per tree for each component were examined

Table 1: Physical quality parameters of wild *Juglans regia* from Bazar-Korgon, Kyrgyzstan

Means and standard deviations of n = 5 trees, for each tree 25 nuts were examined and averaged; no significant differences were found ($p > 0.1$)

Parameter	KU1	KU2	DA1
length (cm)	3.2 ± 0.1	3.1 ± 0.2	3.3 ± 0.4
width (cm)	2.8 ± 0.2	2.9 ± 0.2	2.9 ± 0.3
thickness (cm)	2.9 ± 0.1	2.9 ± 0.1	3.0 ± 0.3
Dg (cm)	2.9 ± 0.1	3.0 ± 0.1	3.0 ± 0.3
spericity	92.6 ± 2.8	96.1 ± 4.2	93.9 ± 5.4
nut mass(g)	8.3 ± 1.5	8.0 ± 1.1	9.0 ± 2.2
kernel mass (g)	3.6 ± 0.7	3.8 ± 0.6	4.3 ± 1.1
KMP (%)	42.3 ± 4.3	46.4 ± 2.0	46.7 ± 1.6
rupture force (N)	268.2 ± 90.0	227.5 ± 54.6	273.6 ± 55.3

Dg - nut geometric mean diameter; KMP - kernel mass proportion; KU1, KU2, DA1 - sampling sites

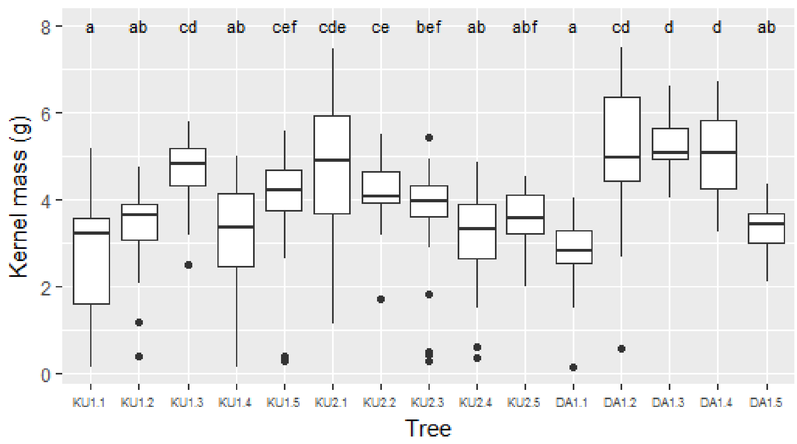


Figure 2: Tree-specific distribution of *J. regia* kernel mass

n = 25 walnut fruits per tree; 5 trees per site KU1, KU2, DA1 were examined; letters indicate significance groups

1. Nut Quality Parameters

Kyrgyz walnut fruits:

✓ show an equal biochemical composition

x smaller nuts & lower kernel yield

2. Genetics or Site Factors?

- Nut quality is highly attributed to genetic variability
- Nut quality does not differ site-specifically

3. Forest Management

- Low soil organic matter due to overuse

Conclusion

Kyrgyz walnut fruit quality:

- Cannot compete internationally
- <u>but</u>: nutritious food source

Private selection & cultivation:

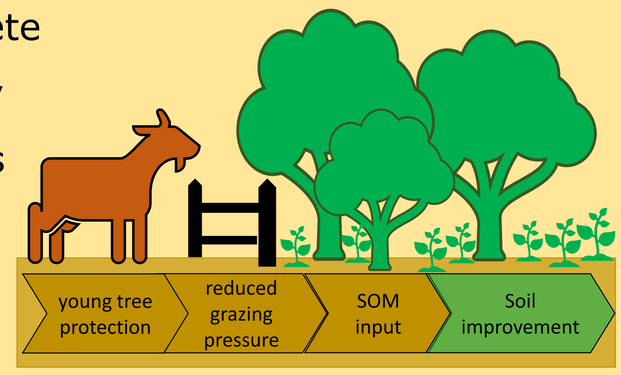


Figure 3: Impact of private tree cultivation
SOM - soil organic matter

- increases nut quality
- benefits local livelihoods
- fosters forest conservation
- maintains genetic diversity of the walnuts

Materials & Methods

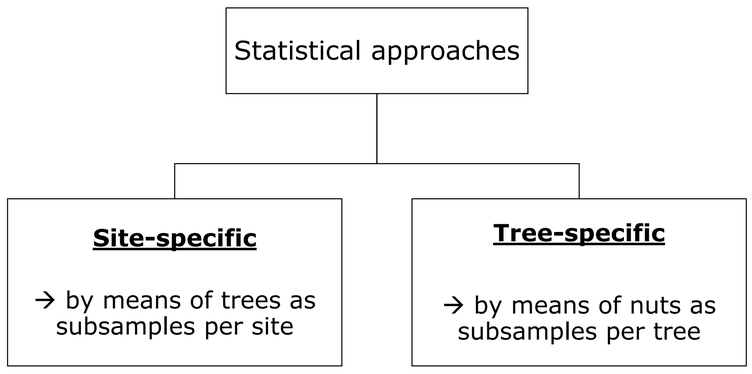
Sampling:

- 3 sampling sites KU1, KU2, DA1
- 5 trees per sampling site
- 25 walnut fruits per tree
- Soil samples of 0 – 30 and 30 – 60 cm under each tree

Physical analysis of walnut fruits
- Nut size, weight, rupture force, shape
- Kernel weight, colour

Chemical analysis of kernels
- Biochemical composition
- Nutrient element profile

Soil parameters
- pH, SOM, EC, carbonate content
- Macro- & Micronutrients



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