

Gaseous nitrogen emissions from grazed grassland



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N₂O Measurements

Sustainable Nitrogen Fertiliser
Use & Disaggregated
Emissions of Nitrogen

3 sites: Hillsborough (HB), Johnstown Castle (JC), Moorepark (MP)

3 seasons: Spring, Summer, Autumn

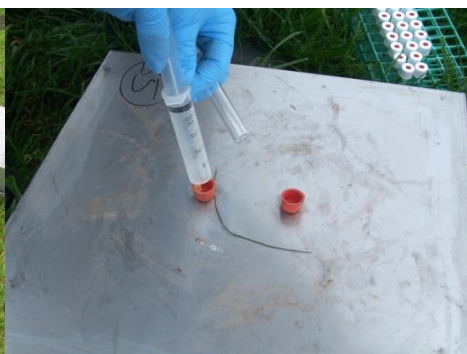
4 treatments: Control, Urine, Dung, Art. Urine

NH₃ Measurements

1 site: Johnstown Castle (JC)

3 seasons: Spring, Summer, Autumn

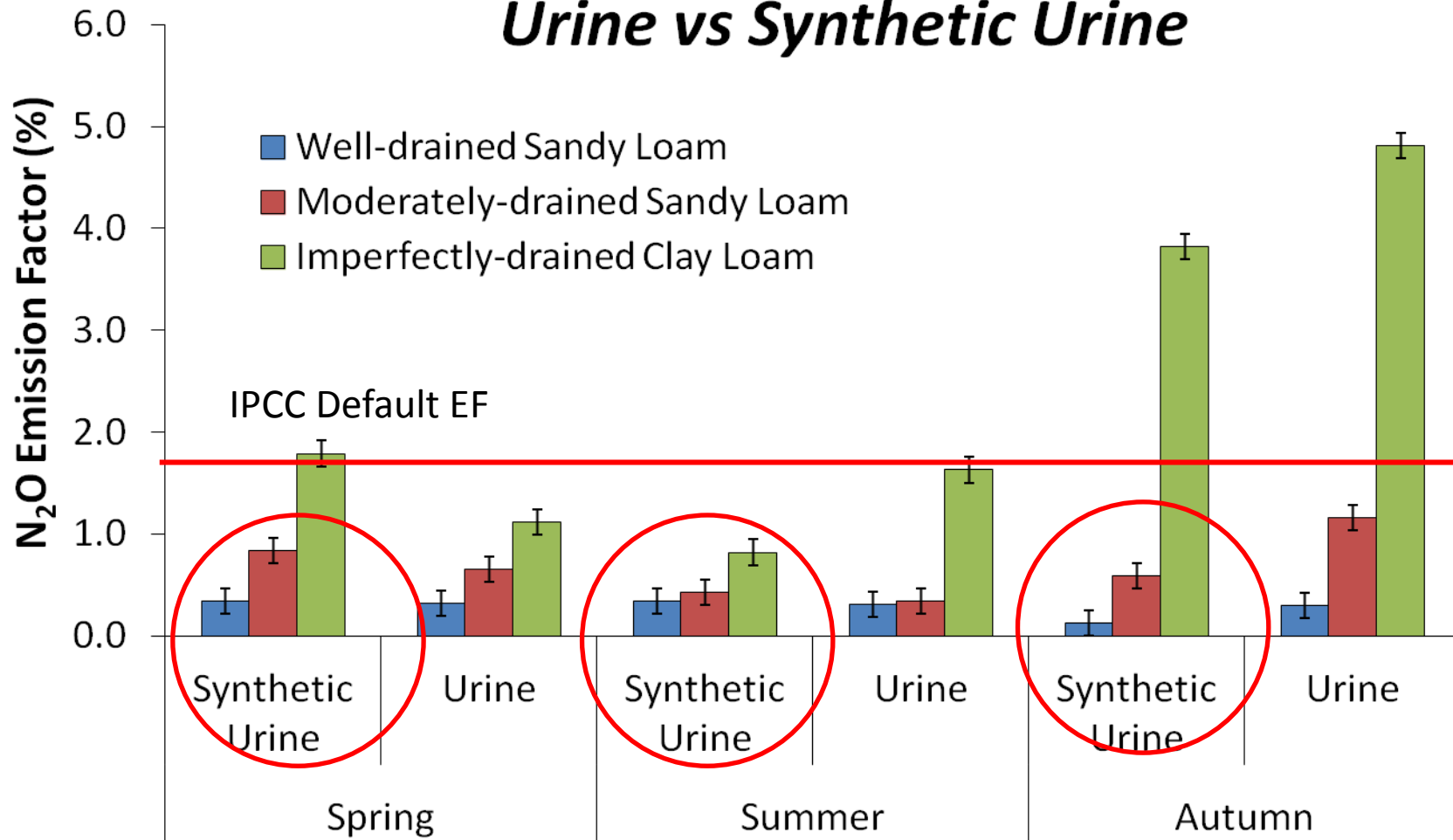
2 treatments: Urine & Dung



N₂O Results

Sustainable Nitrogen Fertiliser
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Urine vs Synthetic Urine

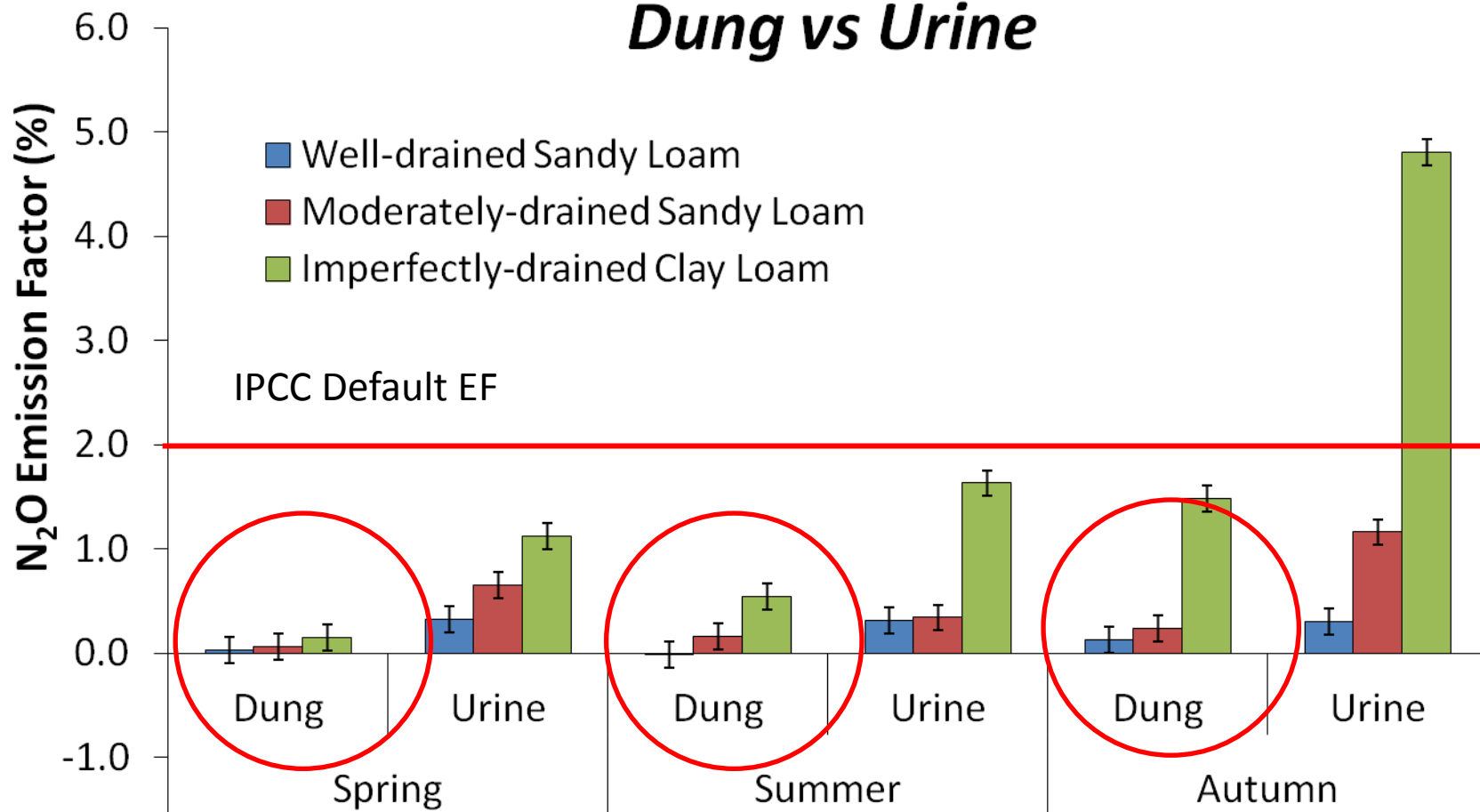


Adapted from Krol *et al.* (2016)

N₂O Results

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Dung vs Urine

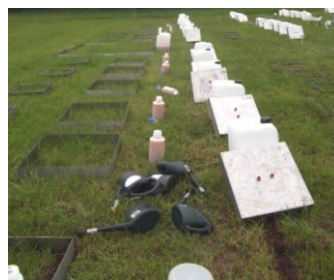


Adapted from Krol *et al.* (2016)

N₂O Summary

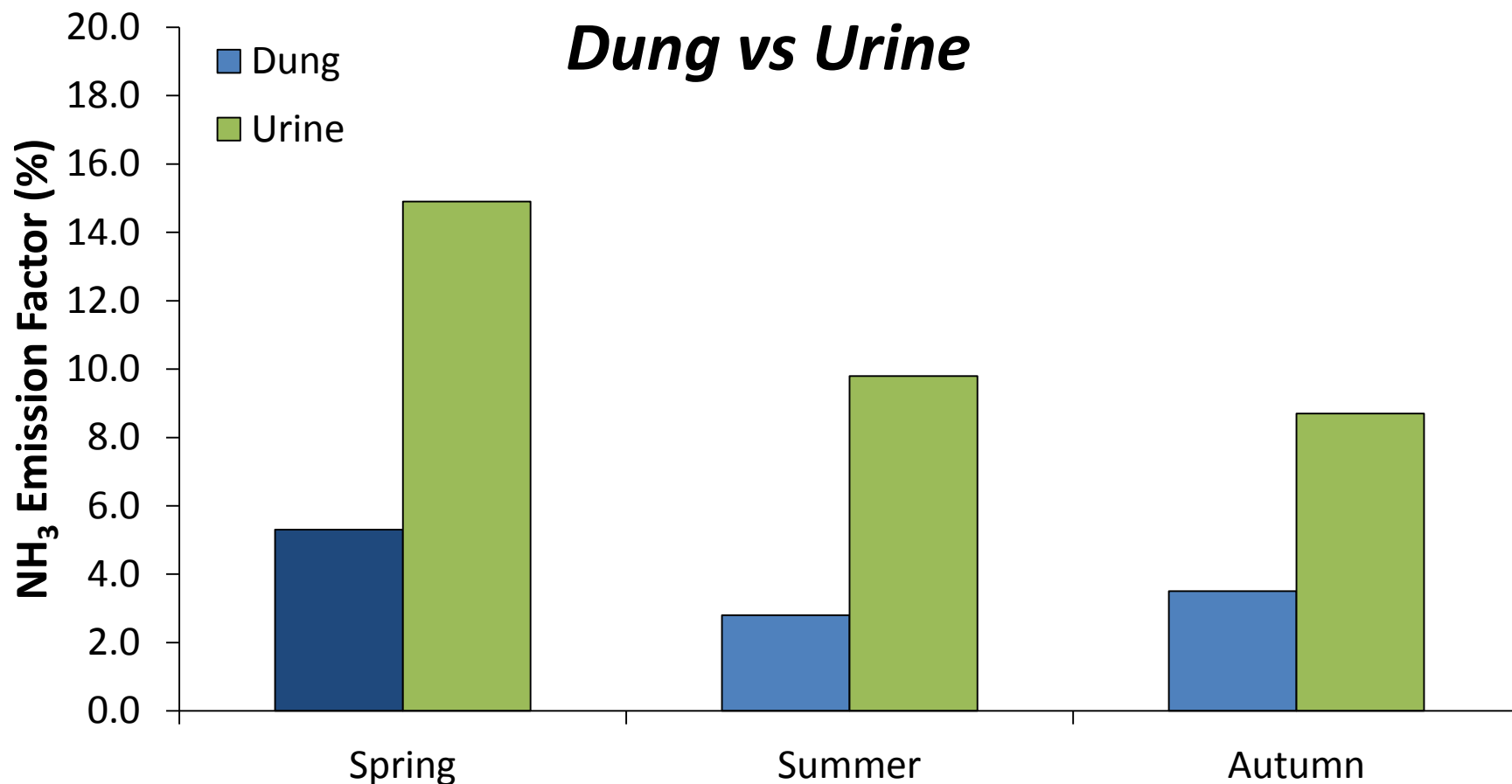
From *Krol et al. (2016)*

- N₂O emissions from urine and dung driven by rainfall, temperature and soil moisture deficit levels
- EFs varied seasonally and were dependent on soil type
- Cumulative N₂O emissions were significantly larger from urine treatments at all sites, with rapid emissions
- Average emission factors (EFs) were considerably lower than IPCC default:
 - Urine: 1.18 %
 - Dung: 0.31 %



NH₃ Results

Sustainable Nitrogen Fertiliser
Use & Disaggregated
Emissions of Nitrogen



Adapted from Fischer *et al.* (2015)

NH₃ Summary

From Fischer *et al.* (2015)

- EFs from urine significantly higher than dung in each season
- Average NH₃ emission factors (EFs) were:
 - Urine: 11.1 %
 - Dung: 3.9 %



Country Specific EFs

Results support:

- Lowering N₂O EF for grazing returns from default 2 %
- Disaggregation of N₂O EFs by excreta type

Grazing Management

Refinement of grazing management strategies to reduce N₂O EFs, particularly in wetter soils

Thank you for your attention

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&

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www.agri-i.ie

References

1. Krol, D.J., R. Carolan, E. Minet, K.L. McGeough, C.J. Watson, P.J. Forrester, G.J. Lanigan and K.G. Richards. 2016. Improving and disaggregating N₂O emission factors for ruminant excreta on temperate pasture soils. *Science of the Total Environment* *in press*.
2. Fischer, K., Burchill, W., Lanigan, G.J., Kaupenjohann, M., Chambers, B., Richards, K.G. and Forrester, P.J. 2016. Ammonia emissions from cattle dung, urine and urine with dicyandiamide. *Soil Use and Management*. 32: 83-91