



Ammonia emissions from crop residues (3.D.1.4)

- Ammonia emission from above-ground crop residues, not living crops
 - Ammonia emission from living crops remains an unresolved issue
- Propose a new method based on a published paper
 - *A methodology for estimating the ammonia emission from crop residues at a national scale*
 - F.J. de Ruijter & J.F.M. Huijsmans
 - <https://doi.org/10.1016/j.aeaoa.2019.100028>

Ammonia emissions from crop residues – new method

$$NH_{3-CropResidues} = \Sigma (A \times N \times F \times EF_{NH_{3-crop\ residues}}) \quad 1$$

Where

$NH_{3-CropResidues}$: NH_3 volatilization (kg NH_3 -N/year) from crop residues

Σ : sum over all crops

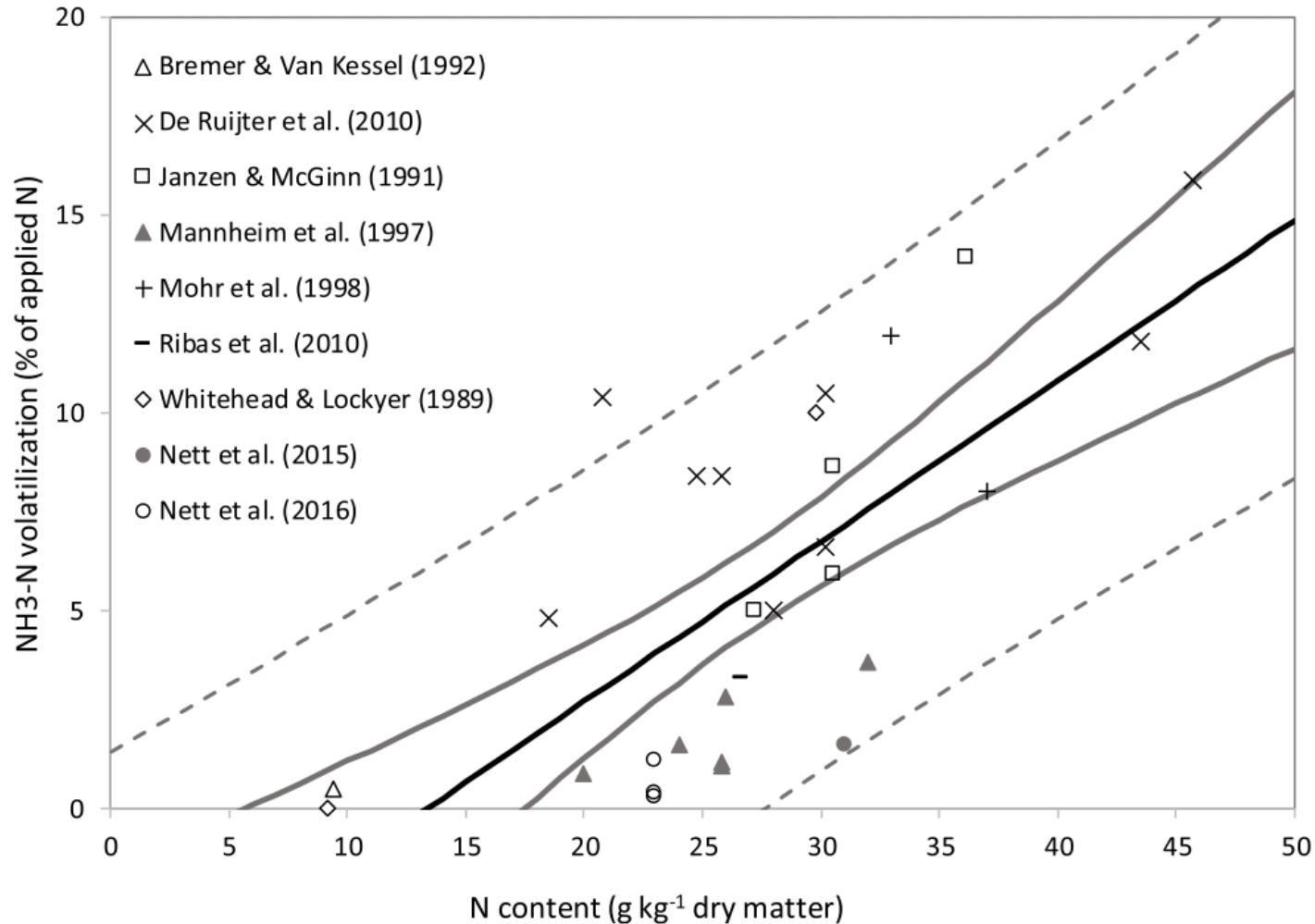
A: crop area harvested (ha)

N: N load in crop residues (kg/ha)

F: contributing fraction, describing the fraction of crop residues that contributes to NH_3 volatilization, i.e. is not being incorporated into the soil during or shortly after harvest (–)

$EF_{NH_{3-crop\ residues}}$: Emission factor as calculated by the regression model

Regression model



Ammonia emissions from crop residues (3.D.1.4)

$EF_{\text{NH}_3\text{-CropResidues}}$ = NH_3 emission factor (% of N input)

N_{content} = N content of the crop residues ($\text{g (kg dry matter)}^{-1}$)

$$EF_{\text{NH}_3\text{-CropResidues}} = 0.41N_{\text{content}} - 5.42$$

- Method uses same activity data as IPCC (2006) method for N_2O emission from crop residues
- Note that only above-ground crop residues should be included



Ammonia emissions from crop residues (3.D.1.4)

- Published paper has a comprehensive list of N concentrations in crop residues
- Need to retain consistency with the N concentrations used for calculating N₂O emissions from crop residues
- Note recent paper on N₂O emissions from crop residues
 - A review and meta-analysis of mitigation measures for nitrous oxide emissions from crop residues
 - <https://doi.org/10.1016/j.scitotenv.2022.154388>
- Propose inclusion of ammonia method in Guidebook 2023 version