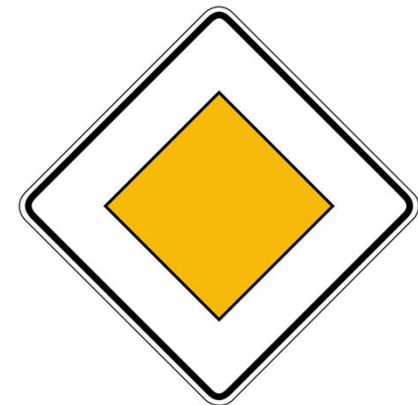


First Results from Modelled Operator Exposure in Greenhouses

Hans Mielke

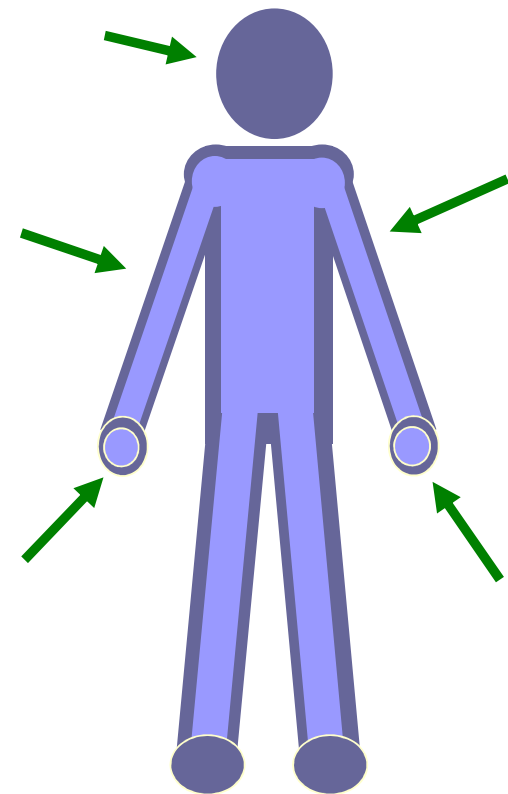
Situation & Procedure

- Currently no harmonized greenhouse model for authorisation purposes in the EU, different approaches used by different MS
- Aim: new greenhouse model for operators on the basis of existing studies
- Model development: same procedure as for AOEM – how well will it work?



Same procedure as for AOEM model

- Same exposure variables
(Hand actual/potential, body actual/potential, head, inhalation)
- Same requirements for studies to be considered for modelling
(OECD, GLP, GAP, ...)
- Same factors
(formulation & density of culture)
- Same data processing
($<LOQ \rightarrow \frac{1}{2} LOQ$, recovery correction, ...)



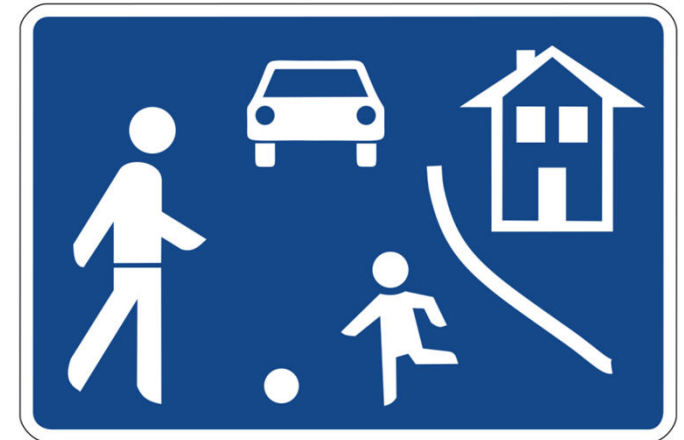
Suitable studies

Equipment:
Spray lances,
Tanks 200 - 3000 L

70 Mixing/Loading
102 Application

40 low crop
62 high crop

7 studies
2001 – 2006
Spain & Italy



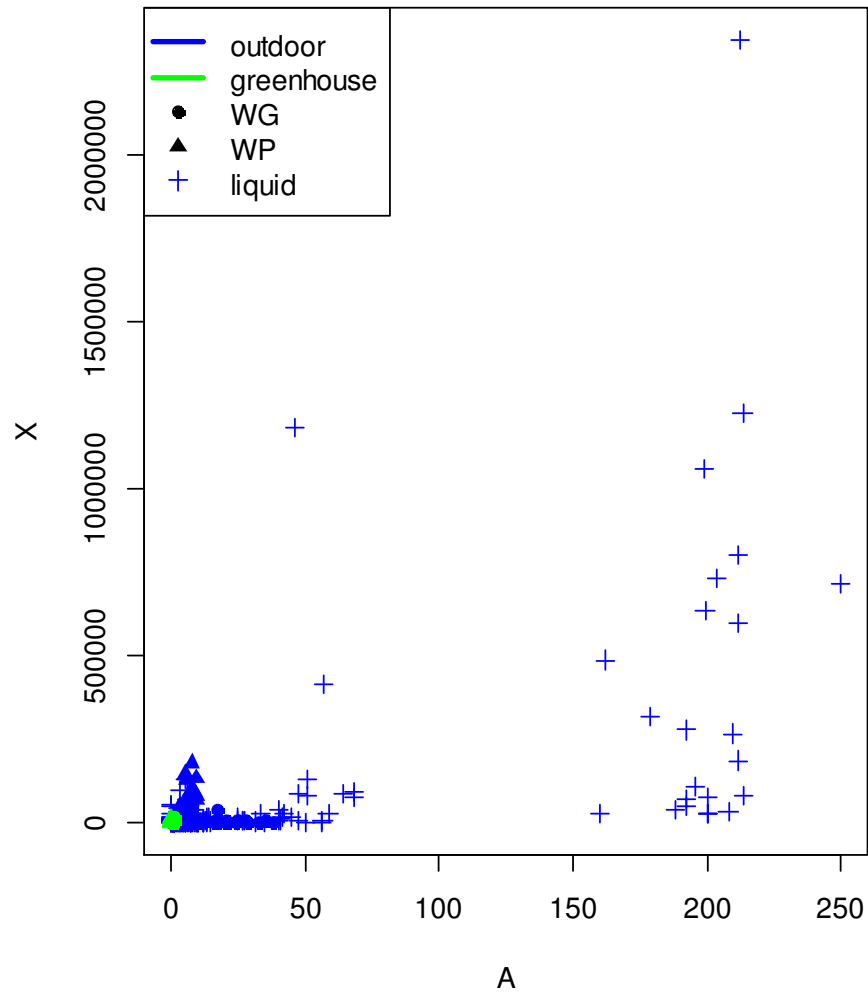
2 formulations:

WG (1-3 kg containers, 0.5 – 2.4 kg a.s./ha)

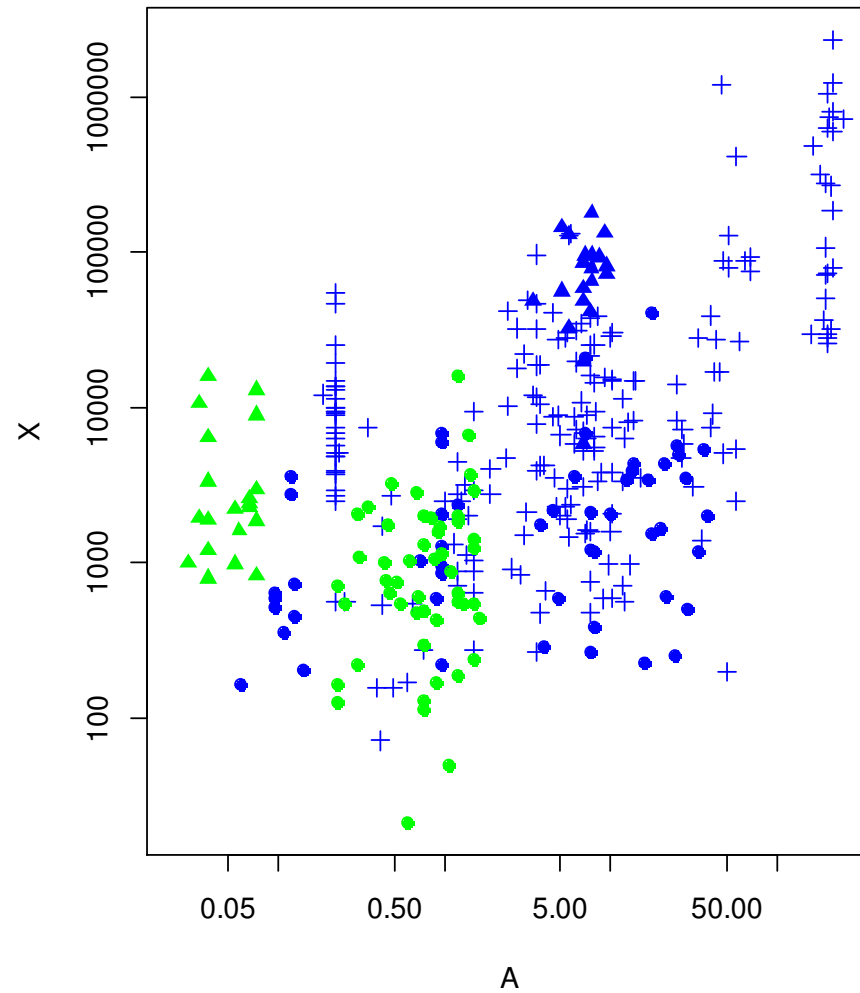
WP (50 g sachets, 150 – 260 g a.s./ha)

Setting up the model

potential hand ML



potential hand ML



Setting up the model

$$\log_{10} X = \alpha \cdot \log_{10} A + F$$

$$X = A^{\alpha} \cdot 10^F$$

$$0 \leq \alpha \leq 1$$

Multiplicative
influence of
factors

Use quantile regression.

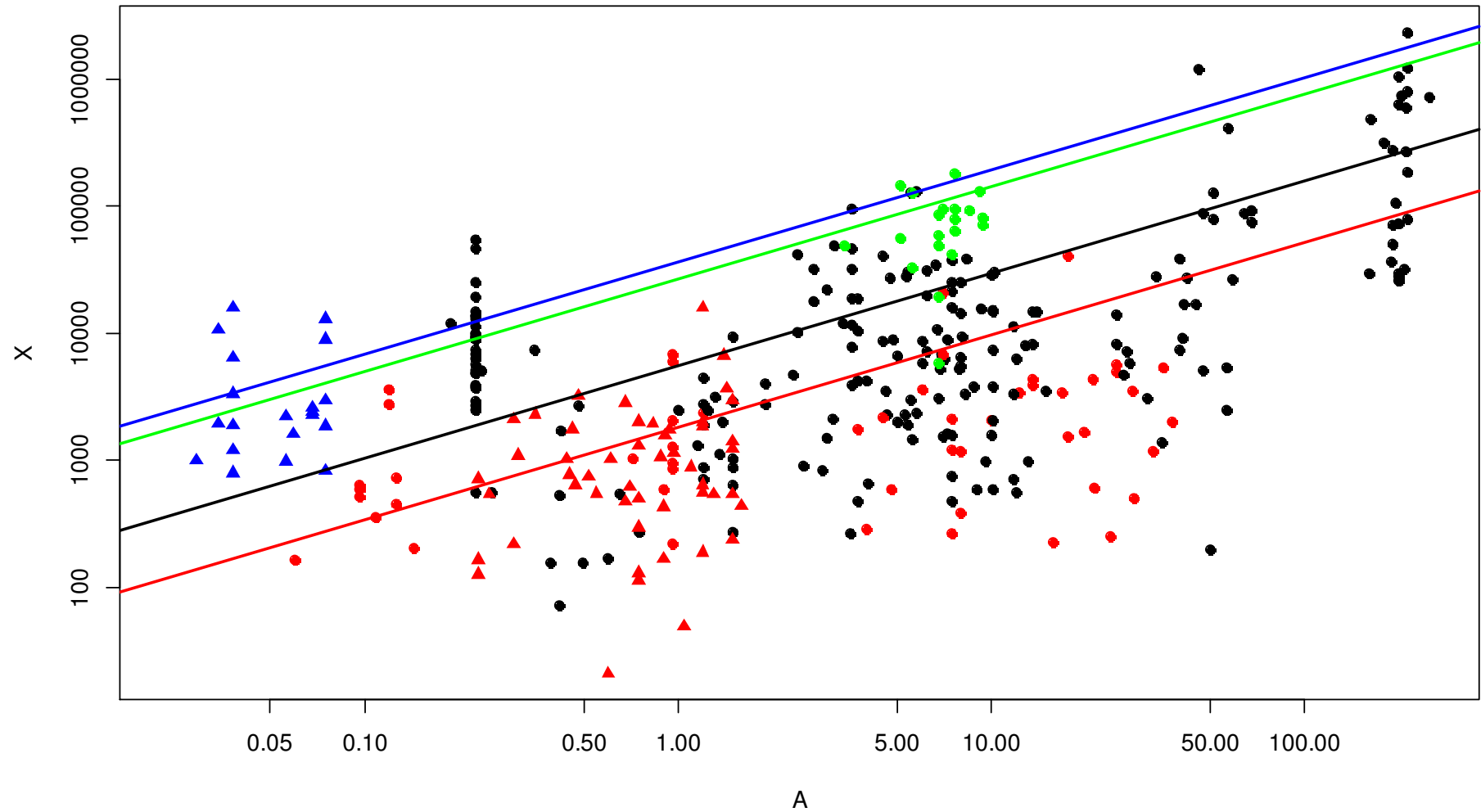
Limitations

- no liquid formulations
- no body exposure for ML
- different levels of PPE used
- no studies in central or northern zone
- And more → **Not enough studies?**



Mixing/Loading tank

potential hand ML

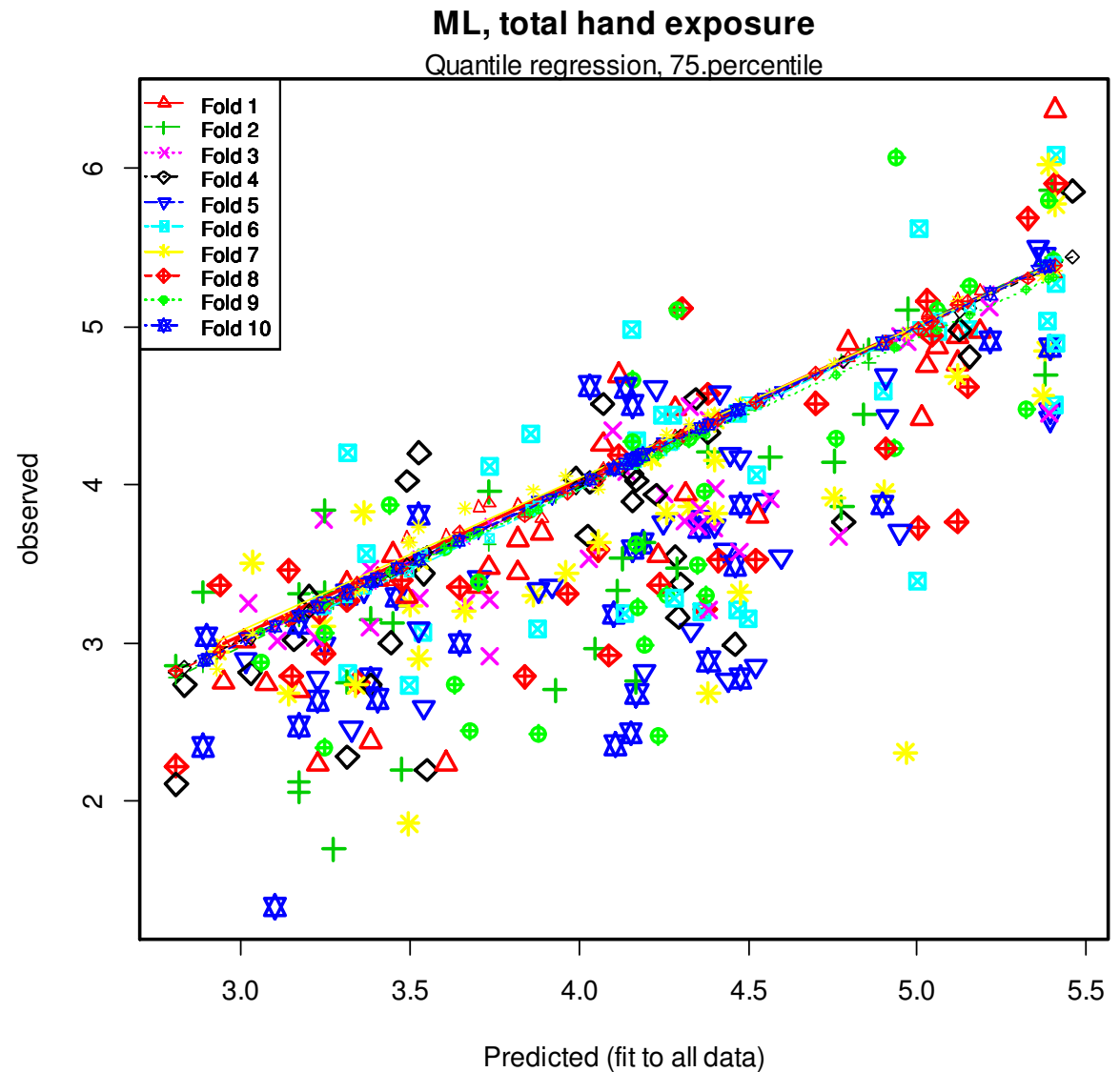


GH data fit well into the outdoor data,
WP sachets have relevant effect on potential hand only

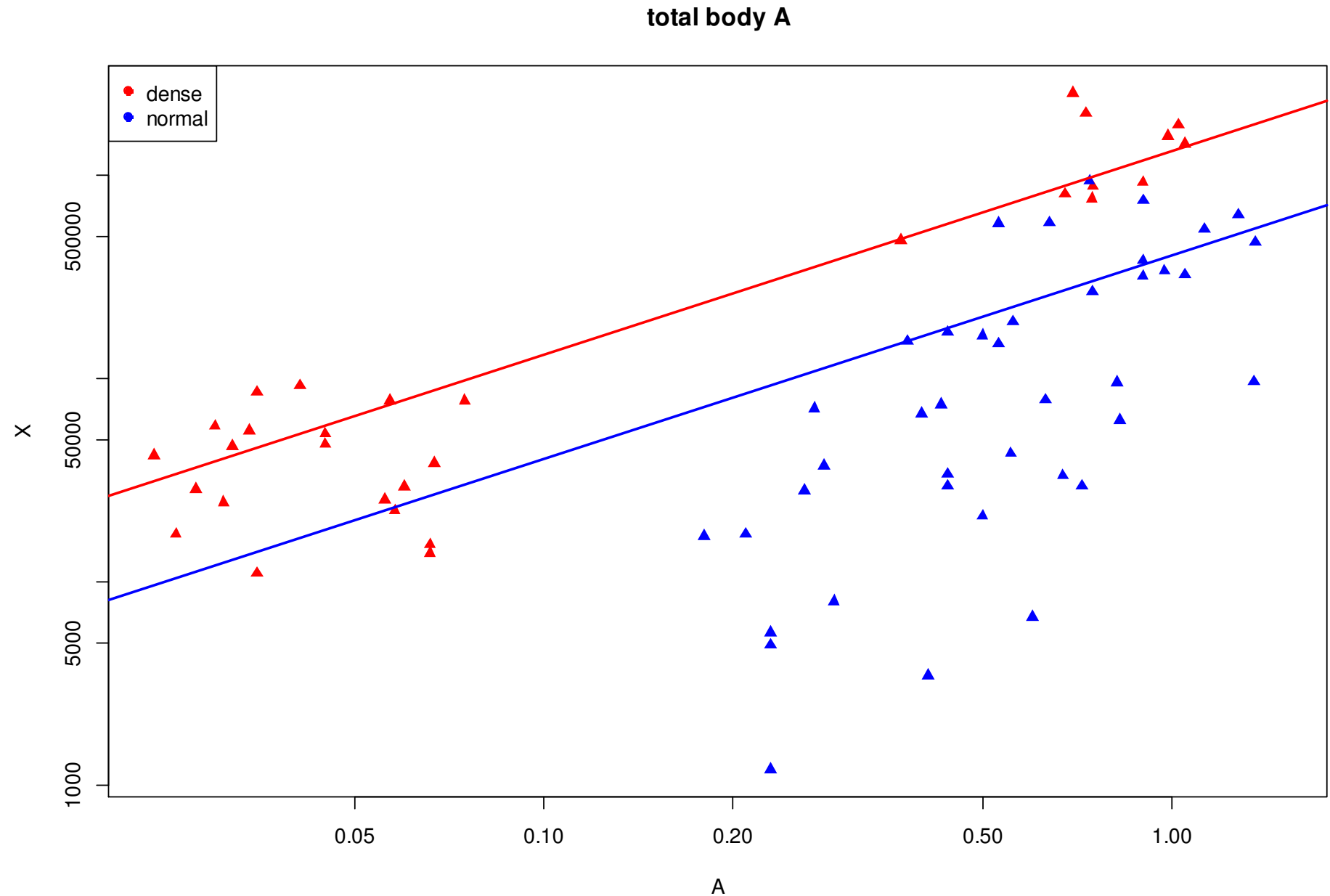
Mixing/Loading tank – cross validation

Model for potential hands:

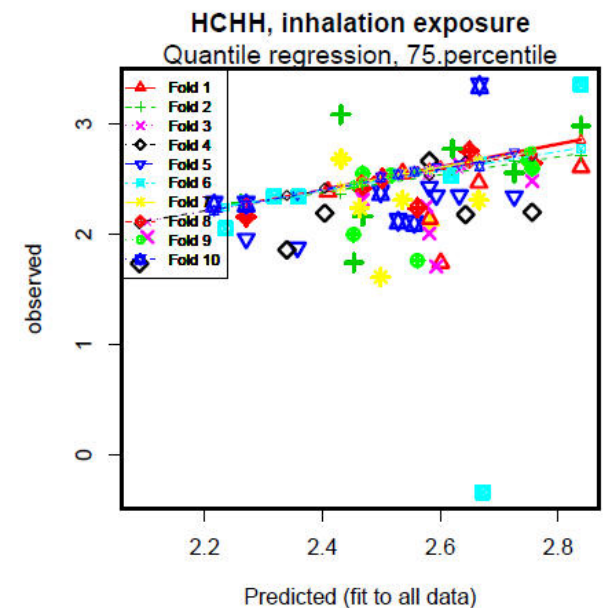
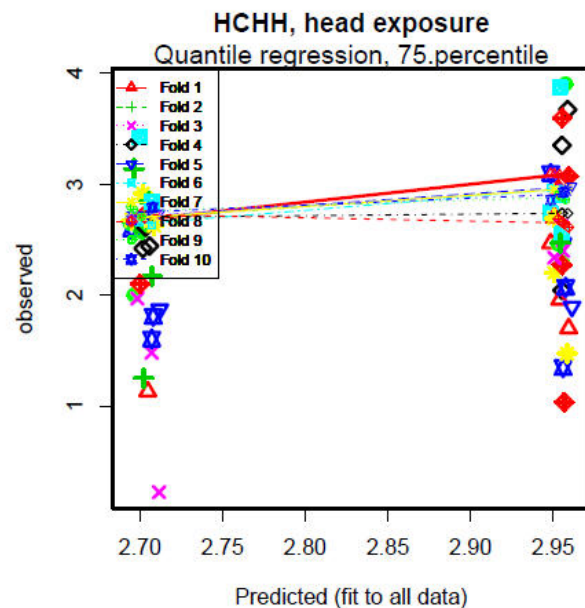
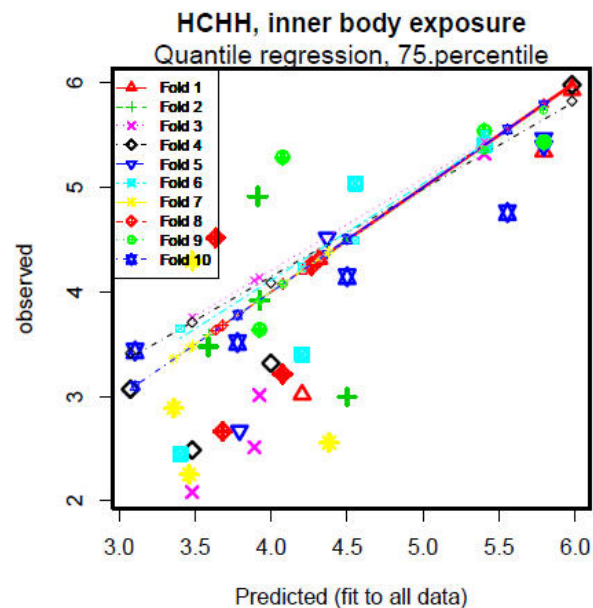
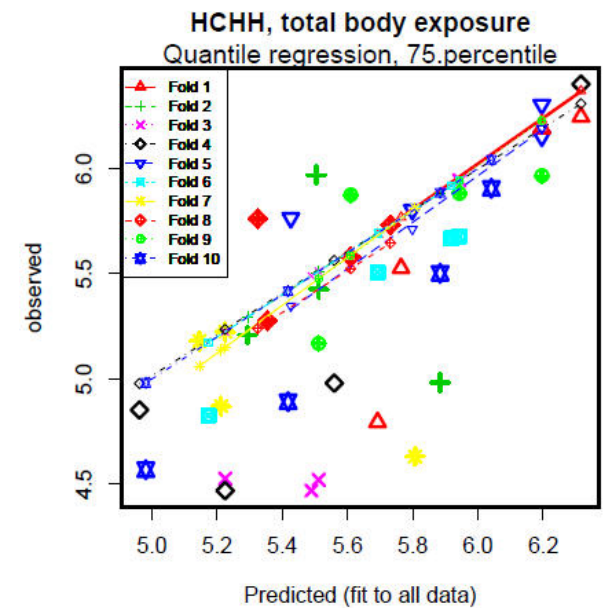
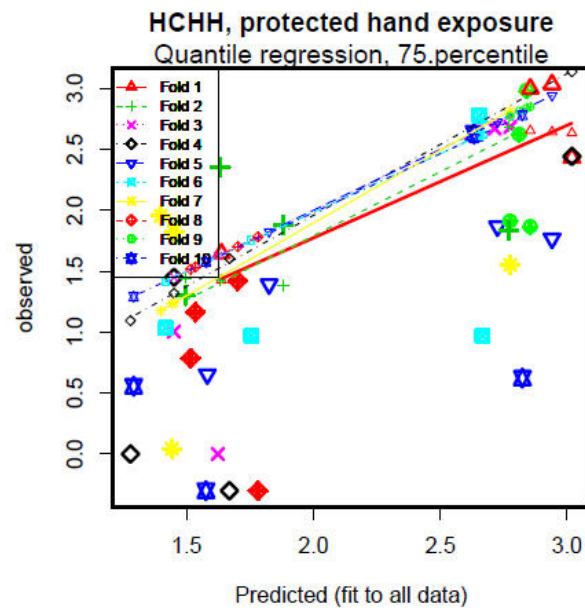
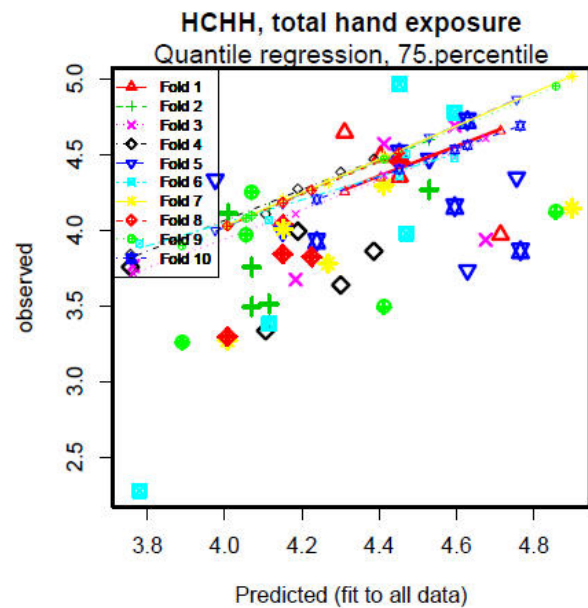
$$\begin{aligned} \log X = & 3.259 \\ & + 0.725 \log A \\ & + 0.485 \text{ formliquid} \\ & + 1.296 \text{ formsachets} \\ & + 1.168 \text{ formWP} \end{aligned}$$



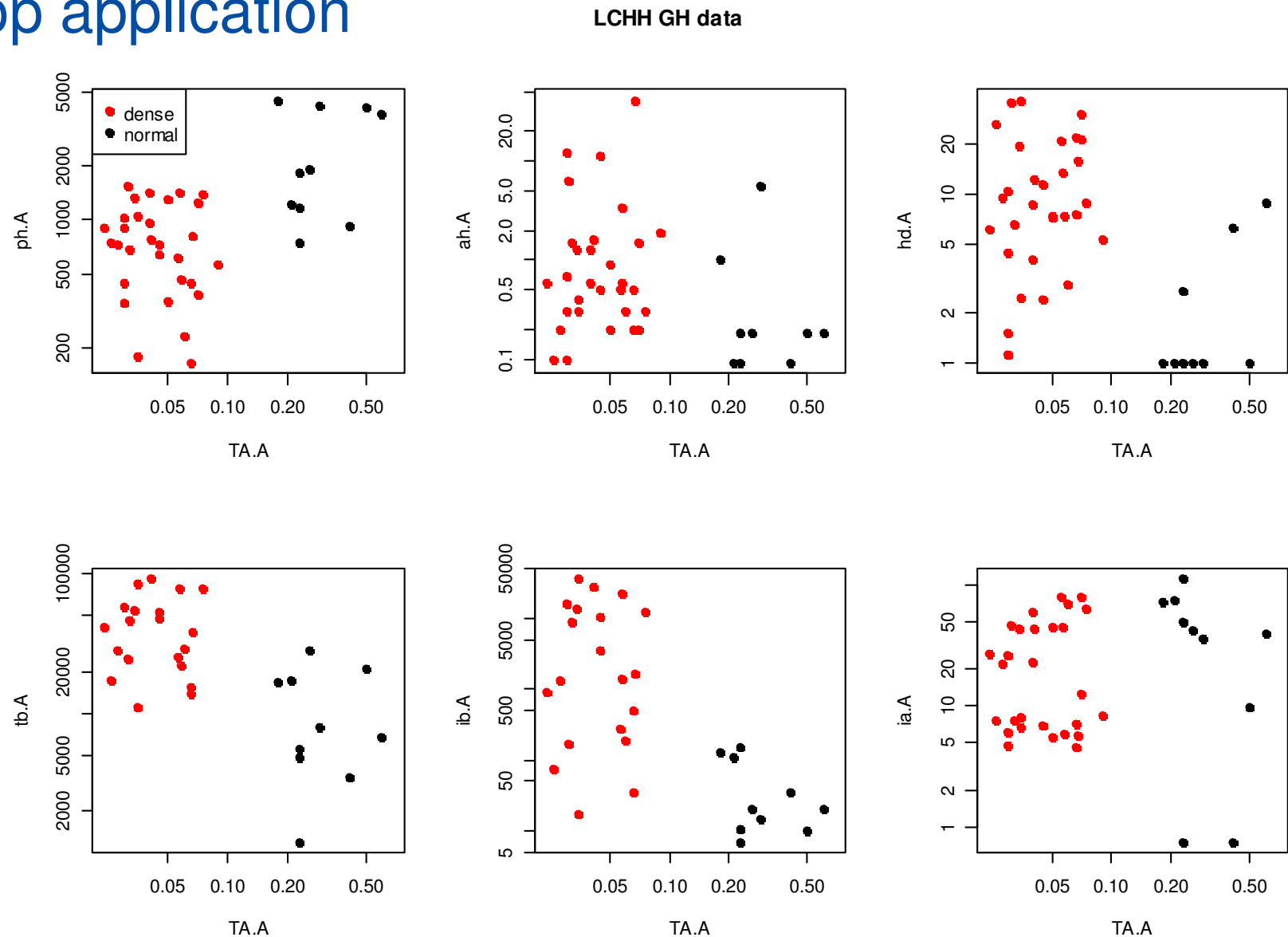
High crop application



High crop application – cross validation



Low crop application

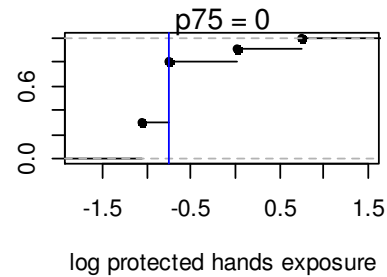
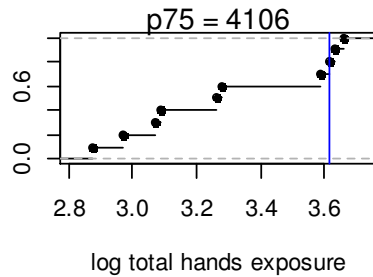


Data not suitable for modelling

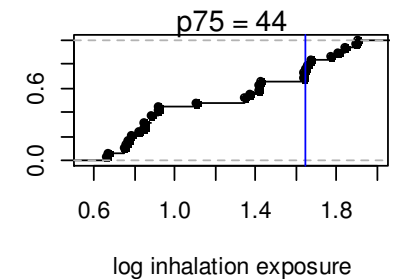
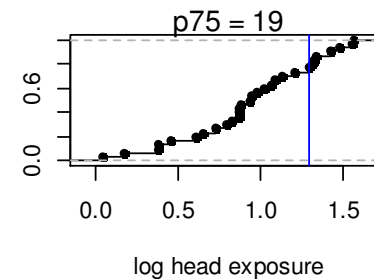
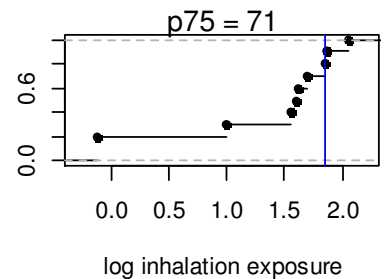
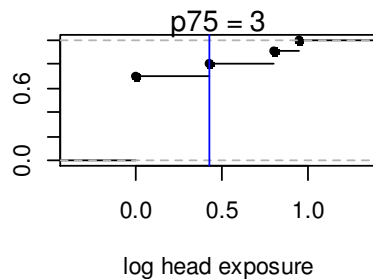
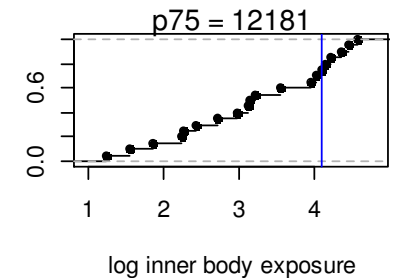
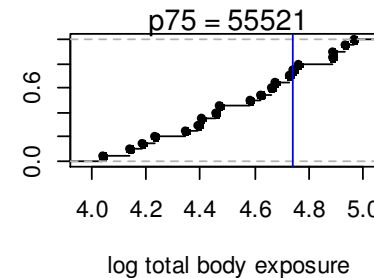
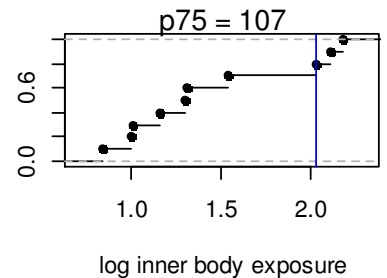
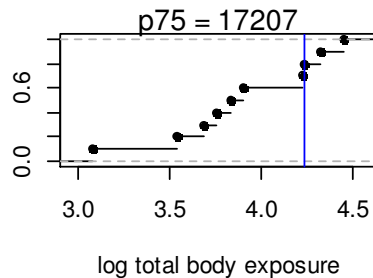
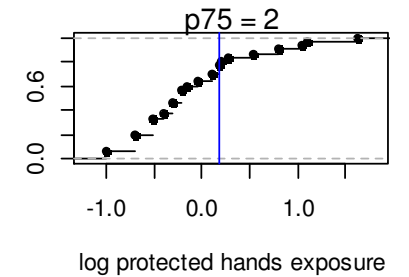
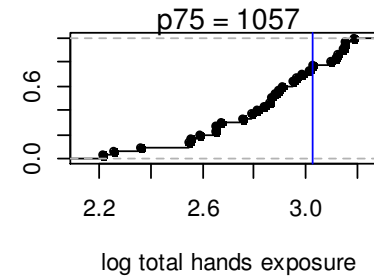
Therefore, use percentile for dense vs. normal culture

Low crop application

GH A (normal) LCHH, 75th percentile estimation



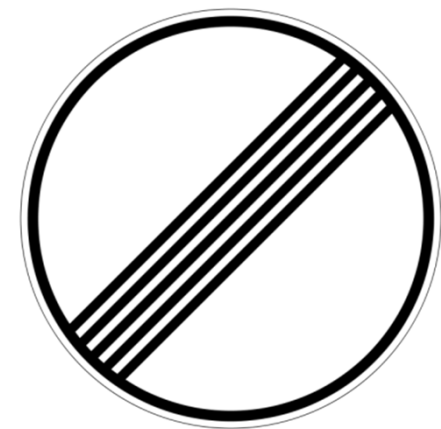
GH A (dense) LCHH, 75th percentile estimation



Need to discuss extrapolation for higher amounts.

Conclusion

- Model structure appropriate
- GH data have different range of amounts used
- Updating models with additional data is advantageous
- Fitted models may be used for exposure assessment
- Look forward to the next talk



Thank you for your attention

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