

Curriculum vitae – excellent/key researcher

Ing. Karel Klem, Ph.D.



Global Change Research Institute, Academy of Sciences of the Czech Republic,
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Profession, positions:

Leader of the Domain of environmental effects on terrestrial ecosystems

Lecturer of Plant ecophysiology, Herbology and Precision agriculture at the Faculty of Agronomy of Mendel University in Brno

Domain of Environmental Effects on Terrestrial Ecosystems

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Web of Science ResearcherID: G-9726-2014

Scopus Author Identifier: 55897742400

Professional specialization

Received the MSc (Ing) degree (1991) in plant production (phytotechnics) from Mendel University in Brno (MENDELU) and PhD (2003) in General plant production from Czech University of Life Sciences Prague. He worked at the Agricultural Research Institute Kroměříž, Ltd., and Agrotest Fyto Ltd., as a researcher in the area of crop production, plant protection, plant ecophysiology and remote sensing till 2009. Since 2009 he is working at Global Change Research Institute CAS and currently he leads the Domain of environmental effects on terrestrial ecosystems and at the same time he teaches Crop ecophysiology, Herbology and Precision Agriculture at the Faculty of Agronomy, Mendel University in Brno. Since 2022 he is leading the Interface and Synthesis Centre of AnaEE ERIC and is a member of Management Board of AnaEE ERIC. He specializes in the effects of climate change on agriculture and forestry, experiments with the effect of elevated CO₂ concentration, the effects of drought, increased temperature and ecosystem processes, including fluxes of GHG at the level of plant/soil. In recent years, he has focused on the issue of long-term carbon sequestration technologies and reductions of N₂O and CH₄ emissions within the framework of regenerative agriculture.

Scientometric indicators according to Web of Science

h-index: 21

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The total sum of papers at WoS total/with impact factor: 105/78

Number of papers with more than 100 citations: 1

Number of highly cited papers (top 1% most cited at the academic field): 1

The total sum of article citations with/without self-citations: 1267/1161

More information at:

<https://www.webofscience.com/wos/author/record/258592,10397599,30221439>

ERC grants

Not attempted so far.

Education and Academic Qualifications

1999–2003 Ph.D., Czech University of Life Sciences Prague, General plant production

1987–1991 Ing., Mendel University in Brno, Phytotechnics

Professional experience

1994 – 2009 Agricultural Research Institute, Ltd., researcher, crop and weed science

2004 – 2009 Agrotest Fyto, Ltd. Scientist, crop and weed science

since 2009 Global Change Research Institute CAS, v. v. i., scientist, head of Domain of environmental effects on terrestrial ecosystems

since 2013 Head of Advisory Board of Global Change Research Institute CAS, v. v. i.

since 2013 Mendel University in Brno, lecturer

since 2008 Mendel University in Brno, member of subject board for Ph.D. study “General plant production”

Awards

Have not been awarded yet

Research topics

Impact of climate change on agricultural and forest ecosystems, climate change adaptation and mitigation in agriculture, ecophysiology of photosynthesis under elevated CO₂ concentration, carbon sequestration and GHG emissions, effect of UV-B radiation, drought and high temperature stress, nutrient deficiency, plant metabolomics, chlorophyll fluorescence imaging techniques, leaf and canopy spectral reflectance, thermal imaging, canopy structure and morphology, plant phenotyping.

Top five most relevant publications between 2016 to 2022

1. Trnka M, Feng S, Semenov MA, Olesen JE; Kersebaum KC, Rötter RP, Semerádová D, **Klem K**, Huang W, Ruiz-Ramos M. Mitigation efforts will not fully alleviate the increase in water scarcity occurrence probability in wheat-producing areas. *Science Advances* 2019, 5, 12. (FORD: Agriculture and Veterinary Sciences; IF= 14.14; CITED: 59), DOI: 10.1126/sciadv.aau2406
2. **Klem K**, Gargallo-Garriga A, Rattanapichai W, Oravec M, Holub P, Veselá B, et al. Distinct Morphological, Physiological, and Biochemical Responses to Light Quality in Barley Leaves and Roots. *Frontiers in Plant Science* 2019;10. (FORD: Agriculture and Veterinary Sciences/Plant sciences; IF= 6.627; CITED: 30) DOI: 10.3389/fpls.2019.01026
3. Hlaváčová M, **Klem K**, Rapantová B, Novotná K, Urban O, Hlavinka P, et al. Interactive effects of high temperature and drought stress during stem elongation, anthesis and early grain filling on the yield formation and photosynthesis of winter wheat. *Field Crops Research* 2018;221:182–95.

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- (FORD: Agriculture and Veterinary Sciences/Agronomy; IF= 6.145; CITED: 53) DOI: 10.1016/j.fcr.2018.02.022
4. Jansen MAK, Ač A, **Klem K**, Urban O. A meta-analysis of the interactive effects of UV and drought on plants. *Plant, Cell & Environment* 2022;45:41–54. (FORD: Agriculture and Veterinary Sciences/Plant sciences; IF= 7.947; CITED: 4) DOI: 10.1111/pce.14221
 5. Holub P, **Klem K**, Tůma I, Vavříková J, Surá K, Veselá B, et al. Application of organic carbon affects mineral nitrogen uptake by winter wheat and leaching in subsoil: Proximal sensing as a tool for agronomic practice. *Science of The Total Environment* 2020;717:137058. (FORD: Agriculture and Veterinary Sciences/Agronomy; IF= 10.754; CITED: 7). DOI: 10.1016/j.scitotenv.2020.137058

Selection of 5 other most relevant publications – cross cutting

1. Robson TM, **Klem K**, Urban O, Jansen M a. K. Re-interpreting plant morphological responses to UV-B radiation. *Plant, Cell & Environment* 2015;38:856–66. (FORD: Agriculture and Veterinary Sciences/Plant science; IF= 7.947; CITED: 162). DOI: 10.1111/pce.12374
2. Urban O, **Klem K**, Ač A, Havránková K, Holišová P, Navrátil M, et al. Impact of clear and cloudy sky conditions on the vertical distribution of photosynthetic CO₂ uptake within a spruce canopy. *Functional Ecology* 2012;26:46–55. (FORD: Agriculture and Veterinary Sciences/Forestry; IF= 6.284; CITED: 96). DOI: 10.1111/pce.12374
3. **Klem K**, Ač A, Holub P, Kováč D, Špunda V, Robson TM, et al. Interactive effects of PAR and UV radiation on the physiology, morphology and leaf optical properties of two barley varieties. *Environmental and Experimental Botany* 2012;75:52–64. (FORD: Agriculture and Veterinary Sciences/Plant sciences; IF= 6.028; CITED: 45) DOI: 10.1016/j.envexpbot.2011.08.008
4. **Klem K**, Záhora J, Zemek F, Trunda P, Tůma I, Novotná K, et al. Interactive effects of water deficit and nitrogen nutrition on winter wheat. Remote sensing methods for their detection. *Agricultural Water Management* 2018;210:171–84. (FORD: Agriculture and Veterinary Sciences/Agronomy; IF= 6.611; CITED: 21) DOI: 10.1016/j.agwat.2018.08.004
5. Kováč D, Veselá B, **Klem K**, Večeřová K, Kmecová ZM, Peñuelas J, et al. Correction of PRI for carotenoid pigment pools improves photosynthesis estimation across different irradiance and temperature conditions. (FORD: Agriculture and Veterinary Sciences/Remote sensing; IF= 13.85; CITED: 10) *Remote Sensing of Environment* 2020;244:111834. DOI: 10.1016/j.rse.2020.111834

Overview of all publications

Web of Science: <https://www.webofscience.com/wos/author/record/258592,10397599,30221439>
Personal page with repository of papers: <https://www.researchgate.net/profile/Karel-Klem>

Overview of research and development activities in the years 2016 to 2022

International projects since 2016:

Horizon Europe: Integrated SERvices supporting a sustainable AGROecological transition. 2022-2027. 177 thousand EUR, Co-applicant

Overview of national projects since 2016:

1. MZe – NAZV (MA): QJ1530373 Integrated pest management of cereal crops against pathogens, weeds and insects for sustainable production of food, feed and raw material, 2015-2018, 2 355 thousand CZK. Co-applicant.
2. CSF: GA18-23702S: Dynamic changes in plant protective mechanisms under elevated CO₂ concentration and higher temperature. 2018-2020, 4988 thousand CZK. Co-applicant.

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3. MZe – NAZV (MA): QK1910197 The strategy for minimizing the impact of drought on sustainable production and barley malting quality. 2019-2023, 1 905 thousand CZK. Co-applicant.
4. CSF: GA21-18532S: Light-induced protection mechanisms based on low-molecular-weight metabolites and their role in plant cross-tolerance to high temperature and drought. 4 311 thousand CZK. Co-applicant.

Applied results since 2016:

1. Portal www.agrorisk.cz – one of the developers of the models and web page
2. 5 certified methodologies,
3. 1 software

International experience (academic internships abroad)

- head of ESFRI AnaEE ERIC Interface and Synthesis Centre, member of management board of AnaEE ERIC
- organisation of international conferences and workshops within COST Action (2), EPPN, EIT Climate KIC, ESFRI AnaEE

Teaching/supervising activities

- lecturer, Precision agriculture, General plant production, Herbology (weed science), Crop ecophysiology, Mendel University in Brno
- supervisor of PhD. Theses, 2 successfully finished, 4 currently supervising Ph.D. students, Mendel University in Brno
- member of subject board for Ph.D. study “General plant production”