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NEWS LETTER

What's new around *Lathyrus*?

Science

Başaran and Sarıta evaluates the agronomic performance, seed quality, and β-ODAP content of five Turkish *Lathyrus sativus* varieties grown under warm humid continental climate conditions, identifying promising cultivars for sustainable and climate-resilient agricultural systems.

Çatal *et al.* demonstrate how the integration of Taguchi experimental design and machine learning models can improve the assessment, prediction, and selection of superior forage-quality traits in naturally occurring *Lathyrus* species.

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People

Jamil Hossain is a PhD researcher at Ghent University in Belgium. His research focuses on understanding how grasspea responds to combined stresses such as waterlogging and soil compaction in rice-based farming systems. Alongside his doctoral studies, he works as a crop researcher at the Pulses Research Centre of the Bangladesh Agricultural Research Institute (BARI). His work aims to support the development of climate-resilient legumes and improve food security for farmers in vulnerable environments.

Good to know

Discover the Second International Lathyrus Day through the reflections of Rind Balech, selected as a travel grant recipient by the Fund to participate in both Lathyrus Day and the 5th ILS Conference through a fully funded sponsorship.

Discover a new grasspea recipe: Zuppa di Cicerchie!

JAMIL HOSSAIN

Behind every research project is a personal story. For Jamil Hossain, that story began in a small rural village in Bangladesh, where daily life revolved around agriculture and where he witnessed firsthand the challenges farmers face. Those early experiences would eventually shape a career dedicated to helping farming communities become more resilient.

Today, Jamil is a PhD researcher at Ghent University and a scientist at the Pulses Research Centre of the Bangladesh Agricultural Research Institute (BARI). His work bridges advanced scientific research and the practical realities of farming systems, combining expertise in agronomy, crop physiology, soil management, and climate resilience. Throughout his career, he has remained closely connected to farmers, not only through research but also through technology transfer, field demonstrations, and training activities that help bring scientific innovations into practice.

Jamil's research has taken him from farmers' fields in Bangladesh to international collaborations in Belgium. In this interview, he reflects on his scientific journey, and his vision for the future of resilient legume crops and sustainable agriculture.

Could you tell us about your background and current work?

I am currently pursuing a PhD at Ghent University within the SENSE Research Group of the Faculty of Bioscience Engineering, under the supervision of Professor Wim Cornelis and Professor Mohammad Mofizur Rahman Jahangir.

Alongside my doctoral research, I work as a crop researcher at the Pulses Research Centre of BARI in Bangladesh. My work focuses on pulse crops, particularly stress physiology, weed management, relay and intercropping systems, soil management, and varietal improvement. Throughout my career I have also been involved in technology transfer, bringing improved agricultural practices and varieties directly to farmers through training, demonstrations, and extension activities.

What inspired your interest in grasspea?

My connection to agriculture began in childhood. Growing up in a remote village, I worked alongside my parents on the farm and saw firsthand the challenges farmers face: flooding, drought, pests, diseases, and unpredictable weather. These experiences motivated me to study agriculture and later join BARI. Grasspea attracted me because it thrives where many other crops fail.

Jamil Hossain is a PhD researcher at Ghent University and a scientist at the Bangladesh Agricultural Research Institute (BARI), focused on building more resilient cropping systems.

JAMIL HOSSAIN

During field visits across Bangladesh, particularly in climate-vulnerable southern regions, I saw how important the crop is for farmers who depend on resilient, low-input production systems. What initially seemed like a simple crop revealed remarkable scientific complexity. Why does one genotype perform well under harsh conditions while another struggles? How do soil conditions determine resilience? Those questions continue to drive my research today.

Jamil is exploring how grasspea copes with the combined challenges of flooding and compacted soils.

Was there a particular influence that shaped your research direction?

Rather than a single moment, my interest developed gradually through interactions with farmers and mentorship from senior pulse scientists at BARI. Later, beginning my PhD with Professor Wim Cornelis fundamentally changed how I viewed crop stress. He encouraged me to see soil not merely as a growing medium but as an active component of the plant stress response. That perspective led me to investigate the combined effects of soil compaction and waterlogging, a challenge frequently encountered in rice-based farming systems.

What is the main focus of your current research?

My research explores how grasspea genotypes respond to the combined stresses of waterlogging and soil compaction. These constraints frequently occur together in rice-based cropping systems, yet they are often studied separately.

I am particularly interested in understanding not only which genotypes survive, but which maintain root function, preserve photosynthetic activity, recover effectively after drainage, and ultimately translate that recovery into biomass and seed production. To answer these questions, I examine plant physiology, root architecture, nodulation, rhizosphere microbiology, and soil physical properties. I am also investigating how stress influences nutritional quality and ODAP levels. The ultimate goal is to dentify resilient genotypes and generate knowledge that supports climate-smart breeding programs.

What makes your approach unique?

Many studies focus primarily on breeding, physiology, or single stress factors. My work seeks to connect the biological response of grasspea with the physical environment surrounding its roots. I integrate measurements of soil compaction, waterlogging, hydraulic conductivity, and soil chemistry with detailed assessments of plant growth, physiology, root development, yield, and nutritional quality.

This systems-based perspective helps explain why certain genotypes succeed under difficult field conditions and how soil properties shape plant performance. It provides a bridge

JAMIL HOSSAIN

between breeding efforts and the realities encountered by farmers in the field.

What has been the most important lesson from your research?

One of the biggest surprises has been discovering how strongly soils influence stress tolerance. I originally expected waterlogging tolerance to be largely determined by genetics. Instead, I found that soil structure and aeration can dramatically alter how a genotype performs. A supposedly tolerant genotype may fail under dense, poorly aerated conditions, while another can exceed expectations when soil conditions are more favorable.

This taught me that plant stress responses cannot be understood in isolation. Soil physics, root behavior, and genotype characteristics interact much more closely than we often assume. Sometimes the real consequences of stress only become visible after drainage or even at harvest.

What strengths does your project bring to the global grasspea community?

One of our greatest strengths is the collaboration between Ghent University, ILVO, and BARI, combining advanced research facilities with real-world farming challenges. This partnership allows us to move from field observations in Bangladesh to controlled experiments and then translate the findings back into practical solutions.

Technology transfer to farmers' field in rice-based cropping system through block demonstration in waterlogging prone areas in Gopalgonj, Bangladesh

The project integrates soil physics, stress physiology, agronomy, and breeding perspectives, while also benefiting from support provided through the Fernand Lambein Fund. Together, these collaborations generate knowledge that is both scientifically rigorous and directly relevant to improving farming systems.

How can the grasspea research community collaborate more effectively?

The community would benefit from greater coordination in evaluating genotypes under standardized conditions, particularly for combined stresses such as waterlogging and soil compaction. Shared protocols and multi-location trials would improve comparability and accelerate progress.

Stronger collaboration among breeders, soil scientists, physiologists, socio-economists, and farmers would also help bridge the gap between laboratory research and practical agricultural solutions. Grasspea improvement should not focus on yield alone, but also on seed quality, market value, and suitability for farming systems.

Which emerging technologies will have the biggest impact?

I believe genomics and gene editing tools such as CRISPR will significantly accelerate the identification of stress-tolerance traits. At the same time, modern phenotyping technologies, including root imaging and soil-plant interaction monitoring, will allow

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researchers to observe processes that were previously hidden belowground. Artificial intelligence and machine learning will help integrate complex datasets across soil physics, plant physiology, and field experiments, while participatory breeding will ensure that innovations are aligned with farmers' needs. Together, these technologies can create a more efficient and farmer-focused research pipeline.

What is one thing you wish more people knew about grasspea?

Grasspea is much more than a crop of last resort. I like to call it a "4G crop" - a God-gifted gracious grain. It is highly resilient, rich in protein, and capable of producing under drought, temporary flooding, marginal soils, and low-input conditions. Farmers value it not only for grain production but also for its contributions to soil health, weed suppression, and flexibility within cropping systems.

With continued breeding efforts, responsible processing, and greater recognition of its ecological value, grasspea has the potential to become a key crop for climate-smart agriculture.

Adaptation of grasspea in a drought-prone area (Barind tract) in Rajshahi, Bangladesh.

LATEST PUBLICATIONS

Evaluating Some Local Grasspea (*Lathyrus sativus* L.) Varieties Under Warm Humid Continental Climate Conditions for Agricultural Sustainability, with a Special Reference to Seed Yield and β-ODAP Content

Başaran, U. and Sarıtaş, Y.
Frontiers in Plant Science 17 (2026): 1750659.
doi: 10.3389/fpls.2026.1750659

This study evaluated five Turkish grasspea (*Lathyrus sativus* L.) varieties under warm humid continental climate conditions to assess their agronomic performance, seed quality, and β-ODAP content. Field trials conducted over two growing seasons compared traits such as seed yield, flowering time, protein content, and neurotoxin concentration. The varieties showed considerable diversity, with average seed yields of 3.11 t ha^{-1} and protein contents of 28.5%, confirming the crop's potential as a low-input, climate-resilient legume.
Among the varieties tested, Duduhanım stood out for its early flowering, high harvest index, and consistently high grain yield, while maintaining average β-ODAP and protein levels. Although the β-ODAP concentrations of the Turkish varieties were slightly higher than values previously reported worldwide, the study highlights the progress of Turkish grasspea breeding and identifies promising cultivars for sustainable agriculture. Overall, the results demonstrate that these varieties can contribute to resilient cropping systems, provided that future breeding efforts continue to target lower β-ODAP content alongside high productivity.

Integrating Taguchi Design And Machine Learning Models For Trait Stability And Predicting Forage Quality In Naturally Occurring Grasspea (*Lathyrus* spp.)

Çatal, M.İ., Sancak, C., Ali, S.A., Aasim, M.
BMC Plant Biology (2026) 26:1188
doi: 10.1186/s12870-026-08991-z

This paper assesses forage quality and trait stability in four naturally occurring *Lathyrus* species (*L. czeczottianus, L. pratensis, L. roseus,* and *L. rotundifolius subsp.* miniatus) by combining Taguchi experimental design with machine learning approaches. Researchers assessed a wide range of nutritional, fiber, digestibility, and mineral traits over two growing seasons and used Random Forest (RF) and LightGBM models to predict forage-quality parameters.
Machine learning models demonstrated strong predictive performance for many forage-quality traits, particularly mineral-related characteristics and feed-value indicators. Both RF and LightGBM achieved high accuracy for traits such as potassium content and mineral-balance ratios, while RF generally outperformed LightGBM for fiber-related traits. However, some variables, especially dry matter intake, remained difficult to predict accurately. Overall, the study highlights the value of integrating Taguchi optimization and machine learning to identify superior forage species, improve trait prediction, and support data-driven breeding and sustainable livestock production systems.

LATEST PUBLICATIONS

Neurolathyrism in Sub-Saharan Africa—Assessing the Neurotoxic Risks of *Lathyrus sativus* Amid Drought and Food Security Challenges

Ayalew B.D., Umar M., Tabasum P., Qadri M., Farooq T., Getachew E.Y., Alemayehu Z.G., Hagos E.H., Gebeyehu H.S., Abebe H.T., Ali N.A., Innocent D.C., Sharew T.M.
Food Safety and Health, 2026 5 Sep 3.
doi: 10.1002/fsh3.70100

Stability Analysis of Yield and Yield Attributing Traits in Grasspea (*Lathyrus sativus* L.) Across Sowing Environments

Ekka, J., Tandekar, K., Tandon, A. L., Chaudhary, P., & Tandon, A.
Journal of Advances in Biology & Biotechnology 29, no. 6 (2026): 435-442.
doi: 10.9734/jabb/2026/v29i64025

Whole Genome Sequencing and Variant Discovery in 344 Global Grasspea (*Lathyrus sativus* L.) Lines

Schreiber, M., Staples, J., Emmrich, P.M., Edwards, A., Martin, C., Bayer, M., Raubach, S., Kilian, B. and Shaw, P.D.
bioRxiv (2026): 2026-06.
doi: 10.64898/2026.06.05.730453

Drought Stress Responses in Grasspea (*Lathyrus sativus* L.): A Physio-biochemical and Molecular Approach

Kumari, M., Kumar, R., Mishra, P.K. and Kumar, A.
Legume Research-An International Journal 1: 8.
doi: 10.18805/LR-5598

Impact of Herbicidal Weed Management on Weed Flora, Productivity, and Soil Microbial Population in Groundnut (*Arachis hypogaea* L.) and its Residual Effect on *Lathyrus* (*Lathyrus sativus* L.)

Jana, K., Nesha, M., Sarkar, A., Pramanik, A., Mondal, R., Verma, N., & Banerjee, S.
International Journal of Bio-Resource & Stress Management, 17(6), 01.
doi: 10.23910/1.2026.7033

LATEST PUBLICATIONS

Study Of Promising Lines of Grasspea (*Lathyrus sativus*) Based on Yield and Agronomic Traits in Different Environments Using Multivariate Statistical Methods

Pourmohammad, A., Vaezi, B., Jozeyan, A. and Pirooz, R.
Crop Science Research in Arid Regions (2026): e243846.
doi: 10.22034/csrar.2025.550094.1517

Response of Three Ecotypes of Grasspea (*Lathyrus sativus* L.) to the Application of Chemical and Biological Fertilizers under Dryland Farming Conditions of Lorestan province

Mirshekari Jahangiri, R., Aghaalikhani, M., & Eyni-Nargeseh, H.
Journal of Agricultural Science and Sustainable Production (2027).
doi: 10.22034/saps.2026.69833.3420

Effect of Long-Term Cold Plasma Pretreatment on the pH-Dependent Emulsifying Properties of Grasspea Protein (*Lathyrus sativus* L.): Mechanistic Insights and Expected Applications

Mehr, H. M.
Food Hydrocolloids (2026): 112787.
doi: 10.1016/j.foodhyd.2026.112787

Neurolathyrism in Delanta, Ethiopia: Prevalence, Associated Factors, and Social Impact: A Cross-Sectional Study

Yesuf, A. E., Mersiehazen, E. E., Abegaz, B. Y., Endale, S. Z., Gebresilssie, B. W., & Batu, B. J.
BMC Neurology 26, no. 1 (2026): 335.
doi: 10.1186/s12883-026-04871-z

LATEST PUBLICATIONS

Edaphoclimatic Modulation of Nutritional Quality, Bioactivity, and Metabolomic Profiles of Grasspea (*Lathyrus sativus L.*) Seeds

Bouhrem, I., Benabdelmoumene, D., Waqar, M., Dahmouni, S., Bengharbi, Z., Zarouri, B., Mediani, A. and Omar, A.I.
Legume Science 8, no. 1 (2026): e70100.
doi: 10.1002/leg3.70100

Development, Optimization and Field Performance Evaluation of a Tractor-Operated *Lathyrus* (*Lathyrus sativus* L.) Harvester

Tuteja, H.S., Naik, R.K., Chowdhury, M., Sarkar, P., Elbeltagi, A., Salem, A. and Elwakeel, A.E.
Results in Engineering (2026): 110182.
doi: 10.1016/j.rineng.2026.110182

Exploring Host Plant Resistance in *Lathyrus sativus* Against Yellowing and Wilt Diseases Caused by *Fusarium curvatum* in Iran

Pouralibaba, H.R., Abrinbana, M. and Taheri, M.T.
Australasian Plant Pathology 55, no. 3 (2026): 54.
doi: 10.1007/s13313-026-01130-0

Grasspea (*Lathyrus sativus* L.) Protein Gels and Microgels: Effects of pH on Structure, Rheological Properties, and Lubrication

Iervese, F., Sabatucci, A., D'Alessio, G., Neri, L., Francioso, A., Pittia, P. and Di Mattia, C.
Food Hydrocolloids (2026): 112682.
doi: 10.1016/j.foodhyd.2026.112682

LATEST PUBLICATIONS

Characterisation of Grasspea (*Lathyrus sativus* L.) Genotype Diversity Identified Key Agronomic Traits for Central European Environments

Bubolz, J., Boldischar, C., Zikeli, S., Lohwasser, U., Döring, T.F. and Reckling, M.
Legume Science 8, no. 1 (2026): e70090.
doi: 10.1002/leg3.70090

Knocking Down miR172f in the Hairy Roots of Grasspea Increases β-ODAP Content and Induces Global Transcriptomic Reprogramming

Liu, X., Zhang, X., Bai, J., Lv, J., Jiang, Y., Zhan, J., Yang, Z., Han, R., You, T., Ma, H. and Cao, N.
Genes 17, no. 3 (2026): 311.
doi: 10.3390/genes17030311

Genetic Improvement of Grasspea (*Lathyrus sativus* L.) Through Gamma-Ray-Induced Mutagenesis: Evaluation of M_4 Progenies for Yield, Agronomic Traits, and Low ODAP Content

Madke, V.S., Manwar, R.M., Nandeshwar, B.C. and Ali, U.M.
Scientific Reports (2026).
doi: s41598-026-41769-9

WHAT'S GOING ON AROUND *LATHYRUS*?

FROM OUR AWARDEES:

The 2nd International Lathyrus Day was held as a satellite event of the 5th International Legume Society (ILS5) Conference in Dubrovnik, Croatia, on 8 June 2026. Participating in this event was both an inspiring and rewarding experience, made possible through the generous support of the Fernand Lambein Fund. As a researcher at ICARDA working specifically on *Lathyrus*, this meeting provided an exceptional opportunity to engage with an international community of scientists, breeders, and development practitioners dedicated to unlocking the potential of this resilient yet underutilized crop.

The scientific sessions highlighted the remarkable progress achieved in *Lathyrus* research across a broad range of disciplines, including molecular breeding, crop physiology, phenotyping, genetics, and sustainable production systems. Presentations demonstrated how modern technologies are increasingly being integrated with conventional breeding approaches to accelerate the development of improved grasspea varieties while simultaneously reducing ODAP content.

Several presentations emphasized the importance of grasspea as a climate-smart and nutrient-rich crop with significant potential to contribute to global food and nutritional security. Its exceptional adaptability to marginal and stress-prone environments reinforces its value in addressing agricultural challenges associated with climate change and resource limitations. These discussions highlighted the importance of continued research and investment in grasspea improvement.

Sessions focusing on molecular, genetic, and physiological research demonstrated the power of combining advanced technologies with breeding expertise to accelerate genetic gains

Rind Balech at the Second International Lathyrus Day

and develop varieties that better meet farmers' needs. Topics included genome-wide association studies, resistance to pests and diseases, high-throughput phenotyping, and genome-editing technologies. Together, these approaches are expanding our understanding of grasspea biology and creating new opportunities for crop improvement.

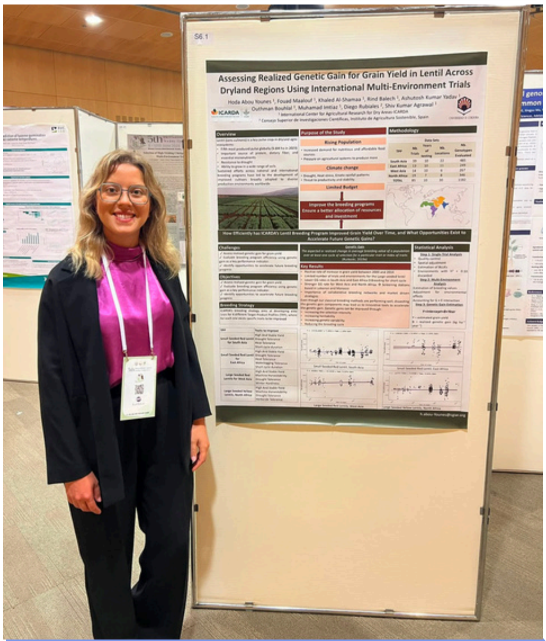
A dedicated session on bridging the gap between research and practical application addressed farmers' perspectives, production systems, and household utilization of grasspea. This session emphasized the importance of ensuring that scientific advances translate into tangible benefits for farming communities. It highlighted the need for strong collaboration among researchers, farmers, policymakers, and agricultural extension services to

WHAT'S GOING ON AROUND *LATHYRUS*?

maximize the impact of crop improvement efforts. This message was particularly well illustrated through a video showcasing farmers' and market needs, demonstrating how targeted *Lathyrus* research and effective management practices can address these demands.

One of the most valuable aspects of the event was the opportunity to interact with colleagues from diverse countries and institutions. The meeting fostered an open and collaborative environment that encouraged the exchange of ideas, the sharing of experiences, and the identification of potential areas for future collaboration in Lathyrus research.

Overall, attending the 2nd International Lathyrus Day was an enriching experience, both scientifically and professionally. I returned with a stronger appreciation of grasspea as a crop with tremendous untapped potential, valuable connections with researchers and partners from around the world who share a common interest in *Lathyrus*, and new perspectives on current research priorities and future directions for grasspea improvement. The event reinforced the importance of collaborative research and strengthened my commitment to contributing to the development of improved grasspea varieties capable of supporting farmers and communities facing challenging production environments.



Rind next to her poster at the conference.

I would like to express my sincere gratitude to the Fernand Lambein Fund for providing me with this opportunity and to the organizers of the 2nd International Lathyrus Day for creating such an engaging and inspiring platform. I look forward to continuing collaboration with the global *Lathyrus* research community and contributing to efforts aimed at realizing the full potential of this remarkable crop.

Rind Balech

Research Associate-Food Legumes Breeding Program, ICARDA-Lebanon

At the Fernand Lambein Fund, we believe that progress begins with connection. That is why supporting early-career researchers remains a central pillar of this event. Congratulations to all the travel grantees who stood out among a highly competitive group of outstanding scientists.

RECIPE: Zuppa di Cicerchie

Ingredients

For the initial simmering:

- 250g (8 oz) dried **grasspea**
- 1 clove or two of **garlic**, left whole
- 1 **bay leaf**
- **Salt**

For the soup:

- 1-2 cloves of **garlic**, finely chopped
- 1 sprig of **rosemary** (and a few sage leaves if you like)
- 200-250g canned **tomatoes**, finely chopped
- **Salt** and **pepper**
- **Olive oil**

For finishing the soup:

- Rounds of toasted **bread**
- **Olive oil**

Instructions:

- Soak the grasspea overnight
- Drain and put them in a large pot with water to cover, together with a pinch of salt and a bay leaf. Simmer until tender. (Times will vary; traditional recipes say 2 hours, but the ones I used were tender in a little over an hour.)
- In a heavy saucepan, Dutch oven or terra-cotta pot, gently sauté the garlic and rosemary (and sage leaves if you're using them) for a minute or two, until the garlic is just golden.
- Add the chopped tomato and let it simmer for about 5 minutes, until it has thickened slightly.
- Remove the garlic and herbs.
- Drain the cooked grasspea and add it to the pot, mixing well.
- Let the grasspea simmer for a few minutes to soak up the flavor of the tomato base.
- Add a ladleful or so of the pot liquor, enough to cover, season generously with salt and pepper, and continue simmering for another 10-15 minutes or so, stirring from time to time.
- Taste and adjust for seasoning.

Enjoy!

Do you have ideas to improve our newsletter or you want to suggest some contents to be covered in the future?

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Pictures: Jean-Pierre Dubois, Suraijt Koley

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