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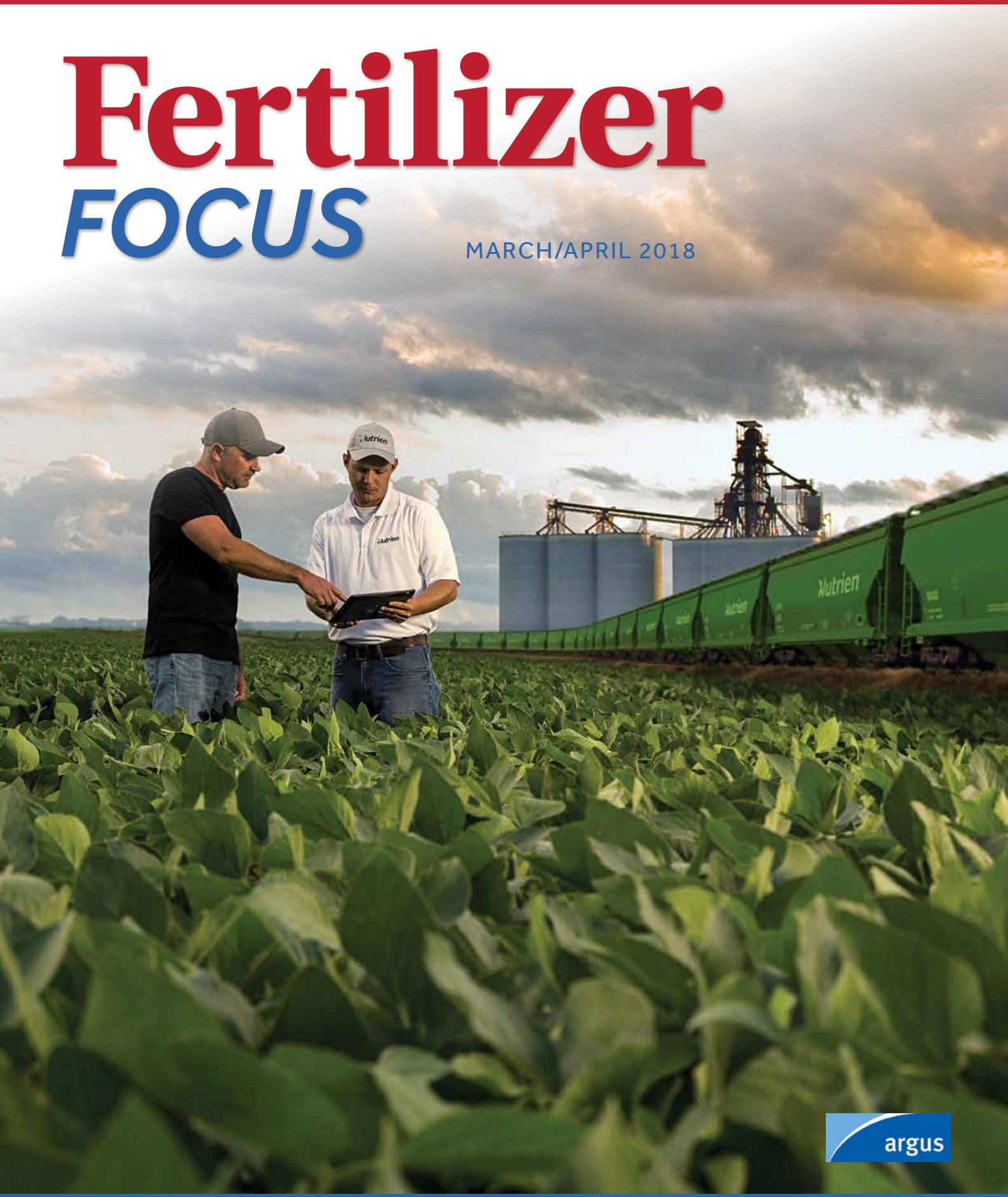

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Spanish plant biotech sector: instrumental to the European economy

by David Lapuente Pinilla, **Project Technician, BIOVEGEN (Spanish Technology Platform for Plant Biotechnology), Spain**

The Spanish agricultural sector has a great strategic importance in the Spanish and European economy. Spain is the 2nd European state in terms of agrarian extension, 8th as a worldwide exporter of agricultural food and 4th within the EU accounting for 12% of European production. Thanks to its export strength, Spanish agriculture generates associated industries (plant improvement, fertilization, plant protection products, and machinery), creates employment, keeps areas rural and contributes decisively to the demographic balance.

The Spanish agrifood sector is a worldwide leader in fruit and vegetable products (7th producer of fruit, 9th in fruit and vegetable products), citrus (6th producer, 1st exporter), vineyards (3rd producer, 1st per cultivated area) and olive groves (1st producer and exporter).

The strategic potential of this sector is increased by the current global situation, where the supply of raw materials, their price variability and the growing demand for food present major challenges when it comes to ensuring the security of food, energy and sovereignty (see challenges below). In this context, research and development play a crucial role in the improvement and optimization of the production process, so they can guarantee food and raw materials in a sustainable and environmentally friendly way.

David Lapuente Pinilla - BIOVEGEN

> *Spain is in great position in terms of plant science*

BIOVEGEN team

Challenges for the sector

The Spanish food and agricultural sector faces global, commercial and technological issues:

Global challenges

- Improving the sustainable use of limited natural resources: water management, nutrients, arable land and energy. The task being hampered by climate change and extreme ambient conditions.
- Improving performance: per hectare (arable land can not be expanded).
- Food crisis: ensuring food for an increasing population: 9.3 billion people projected for 2050. Doubling food consumption. Agriculture production needs to increase by a multiple of 1.7.
- Increasing food quality
- Introducing plants with new added value: plants as bio-factory, bio-sensors and biofuels

Commercial challenges

- Plant variety development requires 5 to 10 years, at a total cost of EUR1.0-1.5 million
- Plant variety exploitation only lasts 5 or 6 years
- Shifting national production to third parties: occidental countries are variety breeders and technology developers
- Global market: long distances, post-harvest processes > food security > high costs

Technological challenges

- Increasing performance, quality and sustainability of plant production
- New applications.

In order to face these challenges, it is essential to use and develop all plant biology based technologies which are currently available.

Characterization of the Spanish food and agriculture business sector

The profile of the agricultural company is of a traditional SMEs, highly leveraged by fixed assets (machinery, greenhouse, etc…) with high fixed costs of production and a high level of uncertainty (production, sale prices etc…) which creates difficulties for income forecasts. These characteristics complicate the investment in R&D, which is a long-term bet when agricultural companies are looking for immediate results.

There are a number of companies in different agricultural subsectors (plant improvement in all kinds of farming-extensive, intensive, ornamental, plant nutrition, crop protection, bioenergy, forest) with major activity and interest in biology and plant biotechnology, but they are not biotechnology companies. It is important to emphasise that while many companies utilise plant biotechnology or are users of the tools provided by plant biotechnology, they are not agricultural biotechnology companies.

It is a very diverse and fragmented sector with great geographical and climatic differences. The industry is facing global, commercial and technological challenges that make it necessary to innovate and incorporate technologies from plant biology, in order to maintain and improve competitiveness, which until now has been based primarily on Spain's privileged climatic conditions.

Spanish plant science status

Spain is in great position in terms of plant science and production:

- Spain occupies the 4th position in Europe (2010) in terms of scientific output in life sciences.
- Spanish scientific production in biotechnology: Spain is tenth worldwide in terms of scientific output and GDP invested in R&D.

BIOVEGEN participates in the launching event of "Retos Colaboración" call in the Spanish Ministry of Economy and Competitiveness.

It is the fourth country in the EU and accounts for 3% globally.
- A third of the research is concerned with the application of 'green biotechnology': plant protection (10%), agriculture and food (14%) and environment (9%).
- Agricultural science is also a major focus

Technology transfer in plant science in Spain

In spite of having a good fiscal framework and support of R&D, the level of knowledge and technology transfer from the scientific sector to business one is lower than expected.

Spanish Food and Agricultural sector need the innovation and the incorporation of technologies from plant biology so they can keep and improve their competitiveness. Nevertheless, it suffers an important deficit in the transfer of technologies, as the following data states:

> *"There are only a few purely agro-biotechnological companies*

- Spain carries out between the 30-40% of the exportation of fruits and vegetables of the whole of the EU, but possesses only 1% of the different kinds of registered products
- For the last 20 years, only 2.3% of the applications at the Community Plant Variety Office were Spanish

There are only a few purely agro-biotechnological companies (understood as intensive companies on R&D on plant biology that offer agricultural services and biotechnological tools to companies), they are usually small, with low invoicing and with serious difficulties to survive and consolidate.

In fact, it is very common to see these companies disappearing only few years after their creation.

It is estimated that only 15% of all the companies in the Spanish biotechnology sector are focused on agro-biotechnology, representing only 9% from the total invoicing of the sector. So, we could say that agro-biotechnology is the private biotechnological sector's 'little brother', and this is reflected in the public subsidy to the R&D received the last decade with only 17% of the subsidies given to biotechnology.

This is mainly because of the reasons previously mentioned (small companies, with high levels of uncertainty, traditional and therefore not intensive on R&D), but also because of a bad connection between researchers and companies, between bidders and technology petitioners.

BIOVEGEN workshop

There is poor collaboration experienced within the agro sector and also poor knowledge about what it is that technology companies need. In addition, the R&D financing tools are not adapted to the characteristics of the agro sector. Consequently, this is an ineffective model to promote R&D in agricultural companies with very little or no experience in this field.

These companies would need to take a first step in gaining confidence and identifying R&D as a useful tool for business development. With this shift, which could be achieved by financing small projects with subsidies, companies would be ready to introduce themselves in advanced phases, with the current credit based financing system. A good example would be to start financing regional R&D projects trough regional mechanisms such as IVACE in Valencia.

Furthermore, another negative issue for the sector is that most of the available agricultural technology, such as plant variety improvement, does not have subsidies for its registration or extension to other countries, in contrast with other patents which have subsidies by the Spanish Patent and Trademark Office.

Finally, the non-consideration of plant varieties as an 'intangible asset' makes it impossible to apply for other R&D promotion mechanism known as the 'patent box'.

BIOVEGEN activities to boost innovation in the field of plant production

BIOVEGEN, the Spanish Technology Platform for Plant Biotechnology, is a public-private partnership, led by the business sector, which brings together entities from the agrifood sector with an interest in R&D in applied Plant Biology. Our objective is to improve the agrifood sector competitiveness through the incorporation of new technologies based on plant biology. To that end, BIOVEGEN coordinates agrifood entities, connects technological offers and demand and generates business opportunities through public-private collaboration. BIOVEGEN develops collaborations and R&D projects, identifying technological challenges of the sector. The platform also serves as an interface between the science community, business sector and administration. To do so, BIOVEGEN offers a wide range of tools to facilitate R&D activities to its members. Currently, the platform has 81 members: 68 companies and 13 research centres, as well as the support of the Secretary of State for R&D, which co-finances the initiative. Furthermore, BIOVEGEN is open to partnerships with other entities within the sector.