

## **Why bean research comes on the scene**

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Grain legumes are major source of vegetable protein for humans and animals. Beans play a special role as the seeds and immature pods are used for the food in cooked or canned forms [1].

Bean seeds and pods are known for their high palatability standards [2,3]. Beans contain proteins (17-32%, which is higher than the amount of protein in meat (20-22%), and fish (18-19%), carbohydrates (mainly starch, 55%), fats (1.8%), fiber, minerals (zinc, copper, potassium, iodine, iron, sulfur, magnesium) and vitamins (A, C, B1, B2, B6, E, and PP) [4-7].

Due to chemical composition, beans reveal strongly positive effect on immune and nervous systems, assist in rising body resistance to viral and microbial invasions, relieve wound healing, control metabolism, improve hematopoietic functions, release from gallbladder and kidneys stones, diminish liver inflammations, effect on the activities of alimentary and urinary tracts. Besides, beans are recorded to defeat bronchial diseases, rheumatism, and intestinal infections, due to abundant antioxidants, iron, vitamin B6, and starch. White beans composition includes magnesium, fiber and folic acid. Their shortage may cause megaloblastic anaemia. Beans are often cropped together with corn, potatoes and melons. So, as the crop carrying nitrogen-fixing bacteria the beans are able to substitute cereals and root crops under rotation.

Due to their polymorphism, beans find an exceptionally wide range of cropping opportunities. Some varieties and lines do vary in vegetable and reproductive growth, as environmental characteristics. Studying these differences it is possible to get further trends in science-based farming technologies which are supposed to be specific for diverse forms, varieties and zones. For this purpose global gene pool of the beans is being extensively investigated. It is of particular interest to get the data on polymorphism of existing bean varieties and lines [1].

Grain legumes play also special role in increasing soil fertility. Owing to the symbiosis with nitrogen-fixing bacteria, beans are able to catch free nitrogen from the air to accumulate it in roots and crop residues in range of 50-100 kg or even more per hectare [8]. Apart from the food, beans may be used as the source of citrate, green manure, animal feed and heirloom plants [9].

Despite countless benefits as increased demand in the market, beans are not much conventional for our country.

Nowadays bean production in Kazakhstan is complied predominantly with imported seeds, raw and canned beans from CIS and other countries. Meanwhile, south-east regions of this country are extremely favourable for the cropping of high-protein bean varieties.

Modern beans breeding is not supported by relevant physiological and biochemical investigations which would allow to evidence in favour of the impact of changing plant morphogenetic traits on biochemical characters, physiological functions, seed productivity, grain quality and plant adaptive traits to be inherited by following generations.

However, researchers of the Department of Molecular Biology and Genetics of al-Farabi Kazakh University are focused on generating different lines of common bean, revealing

specific qualitative characters based on bean breeding and extensive bean introduction.

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