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In memory of Academician Gakash Zakievich Biyashev on the 120th anniversary of his birth

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Abstract

The 120th anniversary of Academician Gakash Zakievich Biyashev's (1906–1987) birth offers an opportunity to reconsider the relationship between agricultural experimentation, plant genetics, and scientific institution building in Kazakhstan. This historical review examines his career through a supplied commemorative biographical document, an Academy of Sciences biobibliography published in 1988, institutional and bibliographic sources, and selected research literature. His work linked the physical environment of crop production to improving hereditary plant material. His research on sugar beet under irrigation, polyploid breeding, and heterosis spanned a career that included agricultural research institutes, Kazakh State University, the Kazakh Academy of Agricultural Sciences, and the Institute of Botany. The commemorative record credits him with supervising three Doctors of Sciences and eighteen Candidates of Sciences, publishing approximately 130 papers, and contributing to the development of Kazakhsky Poligibrid 24. His publication record also documents engagement with reproductive biology, experimental mutagenesis and the wider genetics community. Comparisons with later sugar-beet genomics clarify the continuing relevance of the problems he studied without attributing modern methods to him. His legacy rests on regional agricultural knowledge, experimental breeding, scientific leadership, and training new researchers. Preserving that legacy requires accessible historical sources, careful attribution, and renewed attention to the institutions and people that sustain research across generations.

Keywords: Gakash Biyashev; Kazakhstan; sugar beet; polyploidy; heterosis; plant breeding; scientific education

1. Introduction

On 10 October 2026, Kazakhstan marked the 120th anniversary of the birth of G. Z. Biyashev, a plant scientist whose professional life brought together agronomy, genetics, breeding and higher education. The commemorative document, prepared in his memory, records a career that ran from university training in Tashkent to senior positions in the scientific institutions of the Kazakh Soviet Socialist Republic. His doctorate in agricultural sciences, professorship, and election to two academies reflect the recognition accorded to this work. More substantively, his biography describes a sustained effort to connect plant study with the practical conditions under which crops were grown [1].

G. Z. Biyashev belongs to a generation for whom building a scientific discipline involved much more than publishing experimental results. Research required training specialists, maintaining field experiments, organizing laboratories, and translating observations into recommendations that could be used beyond the experimental plot. A university department and a crop research station represented

different parts of the same undertaking: producing dependable knowledge about plants. His movement between these settings makes his career particularly relevant to the history of genetics and breeding in Kazakhstan [1]. The scientific coherence of G. Z. Biyashev's career emerges from the questions that connected successive periods of research. Throughout his work, he repeatedly asked how to improve plant performance by better understanding both growing conditions and inherited variation. His work on sugar beet provides the clearest example, while his institutional responsibilities and educational influence give the scientific program a wider significance.

The present review draws on a commemorative biographical sheet and the Academy of Sciences volume *G. Z. Biyashev*, published in Alma-Ata in 1988. The latter contains a chronology, a biographical essay, a numbered bibliography, and information about supervised dissertations [2]. An independent biographical account published by Kazinform provides a useful additional check on the broad sequence of appointments and the principal research interests [3]. The purpose is to reconstruct an evidence-based account of G. Z. Biyashev's contribution, place selected themes in their scientific context, and identify the aspects of his legacy that remain meaningful to researchers and students.

2. Sources and historical approach

This article is a narrative historical review rather than a systematic review of experimental findings. The supplied commemorative document is the principal source for the biographical outline. It is read alongside the 1988 biobibliography and online institutional and bibliographic records consulted on 14 October 2026. Modern research papers are used only to explain the subsequent development of questions associated with G. Z. Biyashev's work. The comparison places his contribution within the longer history of crop improvement.

The distinction between an original paper and a bibliographic record is important. The 1988 bibliography identifies several of G. Z. Biyashev's publications, but their original full texts were not available for examination. Such works are discussed below as documented components of his research program. Corresponding reference entries identify this verification route and keep his original works in the historical account. Historical institutional names are retained for the periods in which they were used. Transliteration is standardized as G. Z. Biyashev. The references transliterate Russian-language titles and include English translations to support international readers and bibliographic retrieval.

3. Education and the formation of an agricultural scientist

G. Z. Biyashev was born in 1906 in Kamysty in western Kazakhstan. He pursued his professional education in Tashkent, where the chronology places his university studies in 1928–1931 and his subsequent research and postgraduate training at the All-Union Cotton Research Institute from 1931 to 1936. He then worked at the Kazakh cotton-and-alfalfa experimental station in the Shymkent area between 1936 and 1939. These early appointments grounded his scientific training in the practical problems of irrigated agriculture [1,3]. His Candidate of Sciences dissertation examined how plow-layer structure, aggregate size, and packing density affect soils' water-retaining capacity. The commemorative document preserves the title, and the bibliography records a related publication issued in Tashkent in 1936 [1,4]. The topic is revealed even without reconstructing all of the original experiments. It starts from an agricultural observation that cannot be interpreted solely by looking at the plant: the amount and availability of soil water depend on the physical properties of the rooting environment.

From an experimental reasoning standpoint, separating aggregate size from packing density means distinguishing variables that can change together. A treatment described as improving soil structure may simultaneously alter porosity, water movement, and resistance to root penetration. Determining which of these properties drives an observed response requires controlled comparisons. G. Z.

Biyashev's dissertation topic thus offers an early example of the need to link a practical intervention to an explicit physical explanation, rather than treating an agricultural operation as an indivisible cause. This starting point helps explain the coherence of his later career. Soil-water research and plant breeding address different levels of biological organization, but they meet in crop performance. Researchers evaluate a genotype in a particular soil, under a particular management regime, and during a particular season. His early concern with the rooting environment therefore lays the foundation for his later interest in how plant material interacts with cultivation conditions. This continuity gives his scientific biography a recognizable direction, even as the techniques and institutional settings changed.

In 1939, G. Z. Biyashev joined the Kazakh Institute of Agriculture named after V. R. Williams. The chronology records work as a senior researcher and head of the industrial-crops department, followed by service in 1942–1943 as chief agronomist and deputy head of the Southwestern Administration of the People's Commissariat of Agriculture. He later returned to scientific administration at the institute, serving as deputy director for research until 1950 [1]. These responsibilities brought experimental research into direct contact with agricultural organization. The wartime appointment is an important part of the biography because of the responsibility it entailed. An agronomist working at an administrative level must consider the feasibility of recommendations across farms, labor conditions, and available resources. Such experience makes the difference between an experimental treatment and a practical recommendation especially clear. In a memorial account, this applied dimension deserves to stand alongside academic distinctions.

4. Sugar beet and the integration of biology with agronomy

Sugar beet became the central crop in G. Z. Biyashev's scientific work. He defended his Doctor of Sciences dissertation on sugar-beet cultivation in Kazakhstan in 1947 and received the title of professor in 1949. A monograph on the same subject appeared in 1949 and is recorded as a 228-page volume [1,5]. The dissertation and book indicate that the crop was treated as a substantial research problem requiring synthesis, rather than as an isolated experiment or a temporary administrative assignment. The account emphasizes sugar beet biology under irrigation and recommendations for irrigation management. It also describes research on polyploidy, interline crossing, and heterosis [1]. These themes should be considered together. A breeding program seeks heritable improvement, but an improved population's value depends on whether plants establish reliably, produce a satisfactory root crop, and maintain quality under the conditions of use. Agronomy determines much of that context. G. Z. Biyashev's work matters partly because it keeps these two levels of inquiry in contact.

A sequence of publications recorded in his bibliography supports this interpretation of the program. A 1961 paper coauthored with U. D. Darimbetov addresses sugar-beet growth and productivity in relation to irrigation regime; a 1966 publication by the same collaborators again concerns irrigation in Kazakhstan [6,7]. These records document sustained attention to water management over time. For an industrial crop such as sugar beet, distinguishing biomass from usable product is essential. A large root alone is not a complete breeding objective. Sugar content, harvested root material, and processing properties all affect the crop's value. This is why a scientific sugar beet program can move naturally between morphology, physiological development, chemical composition, and field management. Modern sugar-beet improvement work likewise evaluates root yield alongside sugar content and traits affecting recoverable sugar [8].

The historical record should not be translated into present-day recommendations without new testing. An irrigation treatment evaluated in one soil and period cannot automatically be prescribed for a different variety, irrigation system, or climatic sequence. Nevertheless, the underlying experimental questions remain useful: which developmental stage responds to water availability, which trait should be optimized, and how does a treatment affect both production and quality? These questions keep G. Z. Biyashev's work intellectually relevant even when the original numerical recommendations require reassessment. The commemorative document also names *Sugar Beet on the Irrigated Lands of*

Kazakhstan among his major works. An external agricultural-library catalog records a 1986 edition published by Nauka in Alma-Ata [1,9]. The early monograph and later synthesis on irrigated production show the long duration of his association with the crop.

For readers outside Kazakhstan, the regional character of this research is part of its significance. Plant improvement is often described through internationally recognized methods, but their usefulness depends on knowledge of specific production environments. Building that knowledge is a scientific contribution in its own right. Introducing a crop to a new combination of soils, water regimes, and seasonal conditions demands observation and experimentation. G. Z. Biyashev's work shows how local researchers turn a general crop into a locally understood production system.

5. Polyploidy and heterosis in sugar beet breeding

5.1. Changing ploidy as a breeding approach

The commemorative source attributes polyploid sugar beet research and the development of Kazakhsky Poligibrid 24 to G. Z. Biyashev and his research school, which it reports as being zoned for the Alma-Ata and Taldy-Kurgan regions. It identifies Belotserkovskaya Odnosemyannaya, Yaltushkovskaya Odnosemyannaya, and Kirgizskaya Odnosemyannaya 8 among the materials used. The same source reports five heterotic hybrids, of which two received favorable assessments in station testing [1]. Combining new breeding material with regional evaluation gave this research a practical outcome. Ploidy refers to the number of chromosome sets. Modern reference-genome research describes diploid sugar beet as having eighteen chromosomes [10]. In classical breeding, altering chromosome set number offered a way to change the genetic constitution of breeding material before molecular assays became available. Yet a chromosome count alone cannot establish agricultural value. Breeders must consider ploidy changes alongside fertility, uniformity, development, and performance. This work links cytological characterization to whole-plant evaluation. Using named monogerm varieties in the program also links cytogenetic experimentation to established crop material [1]. For breeders, such material provides a starting population with a cultivation history and recognizable agricultural properties. New variation must be assessed in relation to those properties. This gives a regional breeding program a cumulative character: breeders develop useful combinations from existing resources, characterize them experimentally, and test them under the conditions in which they are intended to be grown.

A particularly relevant bibliographic item is a contribution on chimerism during the establishment of polyploid sugar beet forms, coauthored with V. B. Plokhikh and listed in the materials of the Second All-Union Congress of the Society of Geneticists and Breeders [11]. Its title points to an experimental issue often overlooked in retrospective accounts: material subjected to chromosome manipulation must be characterized, not assumed uniform. It is useful to distinguish three stages when assessing such work. Generating variation creates candidate material. Characterizing it establishes what has actually been produced. Evaluating it determines whether it has breeding value. The reported regional use of Kazakhsky Poligibrid 24 gives the program a practical dimension, while work on polyploid forms indicates that producing and characterizing material were also research problems. A full future history could connect these stages through trial reports, pedigrees and surviving seed collections.

5.2. Heterosis and the problem of reproducible hybrid production

Heterosis concerns a hybrid's performance relative to a specified parental or other reference value. George H. Shull's classical work on maize helped establish the importance of distinguishing heterogeneous crop populations from defined parental lines and their crosses [12]. This comparison helps explain the general logic of hybrid breeding. Sugar beet presented its own reproductive problems within this broader approach to crop improvement. The practical question is not simply whether a vigorous plant can be obtained. A successful hybrid system must allow desirable combinations to be

produced again. This requires attention to parental identity, pollination, seed multiplication, and the resulting crop's performance. G. Z. Biyashev's documented interest in interline crossing is therefore best understood as part of a sustained breeding strategy. The value of a favorable cross depends on a reproducible biological and organizational procedure, not only on the appearance of one experimental generation.

Modern research illustrates why reproductive control remains central in sugar beet. Moritani and colleagues developed markers associated with a nonrestoring allele relevant to identifying maintainer material for Owen-type cytoplasmic male sterility. Their study combined molecular genotyping with crossing tests, showing that evaluating parental function still requires biological validation [13]. This later work shows the continuing importance of fertility systems in sugar-beet breeding. G. Z. Biyashev's program connected the creation of variation with the evaluation of its breeding value. Polyploidy and hybridization provided experimental routes to improvement, while station testing connected the resulting material with agricultural performance [1]. This movement from biological possibility to practical evaluation is central to his contribution as a breeder.

6. Scientific leadership and university education

G. Z. Biyashev's work at Kazakh State University named after S. M. Kirov, now al-Farabi Kazakh National University, occupies a central position in his biography. The provided chronology links him to the Department of Darwinism and Genetics from 1950 and records his ongoing university responsibilities during his leadership at the Institute of Botany [1]. The university's own historical presentation includes him among the prominent scholars associated with the Faculty of Biology and Biotechnology [14]. His significance as an educator therefore belongs to the university's institutional memory and its commemorative account. A department concerned with genetics and evolution has responsibilities beyond transmitting established knowledge. It introduces students to interpreting variation, distinguishing between inherited and environmental effects, and the logic of experimental comparison. In a crop-research setting, students can encounter these ideas directly through crosses, segregating populations, and differences among growing conditions. G. Z. Biyashev's career helps connect conceptual teaching with research material.

The commemorative document credits him with supervising three Doctors of Sciences and eighteen Candidates of Sciences [1]. The two degree categories belong to the Soviet system and should not be collapsed into a single modern doctoral label. The figures indicate the scale of his contribution to advanced training, but they do not by themselves describe the subsequent careers of all the graduates. A future prosopographical study could trace those careers, identify research themes passed between generations and distinguish formal supervision from broader scientific influence. A teacher's influence is often easiest to recognize through people and institutions rather than citation counts. Students learn to choose a problem, handle biological material, and interpret unexpected results. They also learn to collaborate and communicate an experiment clearly. These practices are difficult to quantify retrospectively, but they are central to a discipline's continuity. Recognizing G. Z. Biyashev's educational contribution therefore requires preserving dissertation records, correspondence and recollections alongside his publications.

His election to the Kazakh Academy of Agricultural Sciences in 1957 and his service as vice-president for crop production from 1957 to 1961 placed him in a position to connect research priorities across institutions. In 1967, he became a full member of the Academy of Sciences of the Kazakh SSR [1]. These appointments reflected recognition of his experience and entrusted him with responsibilities extending beyond his own experiments. From 1965 to 1978, G. Z. Biyashev directed the Institute of Botany of the Academy of Sciences of the Kazakh SSR. He subsequently headed its Laboratory of Heterosis until 1987, according to the commemorative chronology [1]. Moving from an institute directorship to leading a specialist laboratory shows that research remained central to his professional

life. It also brings together two scales of scientific work: sustaining an institution with a broad mission and pursuing a defined set of experimental questions.

An institutional legacy is not a solitary achievement. Researchers, technicians, field workers, administrators, and students build institutes, and their development extends across successive directors. G. Z. Biyashev's leadership belongs within that collective history. Recognizing collaboration does not diminish its significance. On the contrary, sustaining cooperation between different specialties is one way a scientist can contribute more than an individual publication record.

Table 1 summarizes the main stages of his scientific career [1].

Table 1. Selected milestones in the career of Gakash Zakievich Biyashev.

Period	Education or appointment	Source
1928–1931	University studies in Tashkent	[1]
1931–1936	Research and postgraduate training at the All-Union Cotton Research Institute	[1]
1936–1939	Kazakh cotton-and-alfalfa experimental station	[1]
1939–1950	Kazakh Institute of Agriculture, with an agricultural-administration appointment in 1942–1943	[1]
1947 / 1949	Doctor of Agricultural Sciences / Professor	[1]
1950–1965	Department of Darwinism and Genetics, Kazakh State University	[1]
1957–1961	Vice-President for Crop Production, Kazakh Academy of Agricultural Sciences	[1]
1965–1978	Director, Institute of Botany, Academy of Sciences of the Kazakh SSR	[1]
1967 / 1971	Full member, Academy of Sciences of the Kazakh SSR / Honored Scientist of the Kazakh SSR	[1]
1978–1987	Head, Laboratory of Heterosis, Institute of Botany	[1]

Dates follow the commemorative chronology. University responsibilities also continued alongside later research appointments.

7. A research program beyond one crop or method

The commemorative account reports about 130 scientific publications, including three monographs, plus brochures and two inventors' certificates [1]. This total helps describe the scale of a career, but it should not be treated as a modern bibliometric measure. The publication culture included journal articles, conference contributions, books, practical recommendations, and works directed to different audiences. Each type served a different purpose, and the historical record is better understood by examining the questions addressed than by ranking outputs solely by their format.

Selected items in the bibliography show the program's breadth. A paper with L. B. Seilova concerned the experimental production of unreduced pollen in diploid sugar beet, while a contribution with M. B. Amerkhanova and I. R. Rakhimbaev concerned clonal micropropagation of inbred sugar-beet lines [15,16]. These titles document engagement with reproductive material and its maintenance. Their historical value lies in showing that researchers experimentally investigated breeding material itself. The distinction between producing a plant and preserving it is fundamental to breeding research. A valuable genotype may be difficult to multiply, or repeated handling may lose its identity. Questions of

propagation, fertility, and material integrity therefore connect basic biology to the day-to-day continuity of a breeding program. The subjects recorded in G. Z. Biyashev's publication list show why a research school cannot be defined only by the varieties it eventually releases: much of its work concerns the biological and technical conditions that make selection possible.

Other cataloged publications address how spring-wheat yield depends on morphological traits under different ecological conditions, and how organophosphorus compounds affect meiosis in barley [17,18]. Their inclusion broadens the picture beyond sugar beet. They show that ecological variation in wheat and cytogenetic responses in barley formed part of the published research program. The two subjects also illustrate different uses of genetics. One concerns interpreting agricultural performance; the other concerns a biological response to an external agent. Their common ground is the need to observe variation systematically and identify the level at which a response occurs. A difference in yield, a difference in morphology, and an abnormality of cell division are not interchangeable endpoints. Combining them into a single historical account should clarify the breadth of inquiry without implying that every result belongs to a single mechanism. A 1980 contribution on the state and prospects of plant-genetic and breeding research in Kazakhstan adds another dimension [19]. Its subject reflects on the field's development. Scientists who organize research must consider how isolated experiments become sustained programs: which problems justify long-term effort, what expertise is missing, and how institutions can support complementary work. G. Z. Biyashev's administrative career makes this broader perspective an appropriate part of his intellectual biography.

8. Scientific exchange and professional service

G. Z. Biyashev's work also reached the wider community of Soviet geneticists. His contribution with V. B. Plokhikh on chimerism during the establishment of polyploid sugar-beet forms appears in the proceedings of the Second All-Union Congress of the Society of Geneticists and Breeders named after N. I. Vavilov. The bibliographic record gives Moscow, 1971, page 21 [11]. This documented contribution places a specific research question from his program within the society's scientific exchange. Conference publications give a different view of a scientific career from monographs or appointment lists. They show the problems that researchers chose to bring before colleagues and the communities in which those problems were discussed. In this case, the subject was an experimental difficulty directly relevant to producing polyploid breeding material. The record links a regional crop-improvement program with a wider discussion of genetic methods.

His public service included participation in the society for disseminating political and scientific knowledge in the Kazakh SSR and service as a deputy of the Alma-Ata city council. The commemorative document records these activities alongside his scientific appointments [1]. They add a public dimension to a career otherwise described mainly through research and university work. Such responsibilities reflect the multiple audiences for a scientist's work. A technical publication addresses specialists; teaching prepares new practitioners; scientific communication reaches readers and listeners who may not share the same disciplinary training. G. Z. Biyashev's career included all of these settings. His example encourages an understanding of scientific leadership that includes communication and public engagement, as well as directing experiments.

9. Reading the legacy in the genomic era

G. Z. Biyashev's scientific lifetime ended before the development of the genomic resources that now shape crop improvement. Nevertheless, the questions associated with his work remain recognizable: how to combine useful variation, control reproduction, evaluate quantitative traits, and select material suited to a production environment. A comparison with later research is therefore informative when framed as a continuity of problems. The comparison also shows how successive generations can revisit

a persistent biological problem with increasingly powerful methods. Dohm and colleagues' 2014 publication of a sugar-beet reference genome provided a framework for locating genes and developing markers across the genome [10]. This changed the resolution at which researchers could investigate inherited variation. The historical breeder's categories (parent, line, cross, phenotype, and population) did not disappear, but researchers could increasingly link them to sequence variation. The contrast helps locate G. Z. Biyashev's contribution: his work belongs to the experimental and institutional history that made crop improvement possible under the tools and conditions of his time. The flowering analysis provides another example. Pin and colleagues identified the role of *BOLTING TIME CONTROL 1* in life-cycle regulation and domestication of beet, connecting a breeding-relevant developmental transition with a defined molecular component [20]. This later result demonstrates how a problem once approached through development and inheritance can be investigated mechanistically. The comparison is useful precisely because it respects the difference between a historical research question and its later molecular explanation.

Genome-wide association mapping in elite sugar beet has examined agronomic traits using marker data from 924 lines, identifying loci and genetic interactions relevant to complex performance [8]. Subsequent genomic-selection research in sugar-beet breeding populations evaluated breeding-value prediction and the transferability of predictions between sets of material [21]. Together, these studies show how quantitative breeding questions can be approached with genome-scale data, while also demonstrating the continuing importance of the population used for inference and the quality of phenotypic evaluation. This modern comparison offers a practical lesson in G. Z. Biyashev's own terms: technological improvement should strengthen the connection between genetic information and agricultural observation. A molecular result gains breeding value when it helps make a better decision about material that can be grown, crossed, and evaluated. That decision still depends on the target environment and the intended product. G. Z. Biyashev's association with both irrigated-crop research and genetic improvement makes this relationship a suitable focus for contemporary reflection, without requiring claims that his methods were identical to ours.

The same reasoning applies to scientific education. Students now encounter large datasets and computational predictions, but must still understand what was measured, how plants were sampled, and what comparison supports a conclusion. Historical case studies can help make these questions concrete. A study of a breeding program is particularly effective because it follows the material from biological variation to selection and testing. Teaching G. Z. Biyashev's career this way would connect commemorating an individual with an examination of how dependable agricultural knowledge is produced.

10. Preserving a scientific legacy for Kazakhstan

An anniversary creates an opportunity to preserve evidence that may otherwise become difficult to recover. For G. Z. Biyashev, a useful next step would be a verified digital bibliography that links each entry to a scan, catalog record, or archival location. The 1988 volume provides a starting structure [2]. A digital resource could retain the original title, add an English translation, consistently identify coauthors, and distinguish examined full texts from entries known only through catalogs. Corrections could be documented rather than silently replacing earlier records. An accessible historical record can also serve teaching. Students could follow a research question's development across a dissertation, a journal article, and a later synthesis, learning how scientific knowledge accumulates through different forms of publication. Reading the original language alongside an English translation would preserve the connection with the source while bringing Kazakhstan's scientific history to an international audience. Such work could become a useful collaborative project for students, librarians and historians of science.

Preservation should extend beyond publications. Where surviving material can be identified, pedigrees, field books, seed accessions, laboratory records and dissertation documents could help connect written reports with the research that produced them. It would be premature to assume that any particular line

or population is still extant. An inventory should first establish identity, provenance and condition. Only then could surviving material be considered for characterization or renewed use. The historical and biological components of a collection would both need attention. Oral histories could complement written documentation, provided they are clearly identified as recollections and compared with contemporary records. Former students and colleagues may remember how a problem was selected, how collaborations developed or how a laboratory was organized. Such accounts can reveal aspects of scientific life that formal biographies omit. They should enrich the record without automatically resolving documentary contradictions. A careful combination of personal testimony and archival evidence would give a fuller account of the human relationships behind the research.

The contemporary Kazakhstan Society of Geneticists and Breeders provides a suitable setting for this work. Its public description emphasizes cooperation across genetic and breeding disciplines, while its journal *Contig* offers a forum for research and scientific communication [22,23]. A historical article in that forum can help connect the current community with earlier institutional experience. For young researchers, the most useful aspect of G. Z. Biyashev's example is the sustained connection between a scientific question and the conditions needed to investigate it. A successful career may include an experiment, a breeding population, a laboratory and a group of trained colleagues. These achievements are related, but none substitutes for the others. Remembering that relationship can broaden the meaning of scientific success beyond a single project's output or a single publication's visibility.

11. Conclusions

Gakash Zakievich Biyashev's contribution to Kazakhstan's science combined crop research, genetic improvement, university education, and institutional leadership. His work on irrigated sugar beet addressed agricultural production challenges, while his programs on polyploidy and heterosis improved plant material. His appointments at Kazakh State University, the Kazakh Academy of Agricultural Sciences and the Institute of Botany gave these scientific interests an educational and organizational reach [1]. His career demonstrates the value of a research tradition in which agricultural observation, experimental breeding and scientific training develop together. The methods available to plant scientists have changed substantially since his lifetime, but the need to connect genetic improvement with reliable evaluation and regional knowledge remains. This enduring relevance is why his work matters to contemporary genetics and breeding. On the 120th anniversary of his birth, G. Z. Biyashev is remembered for helping bring agricultural problems, experimental plant science, and the preparation of new specialists into a common professional undertaking. His legacy invites continued study of both the science and the institutions that supported it. Preserving his works, documenting his students' careers, and making this history accessible to the next generation would give the commemoration a lasting scholarly purpose.

Use of Generative AI

The author used OpenAI ChatGPT to assist with source discovery, organization, and manuscript formatting. Responsibility for verification, revision, and approval of the final article rests with the author.

Data Availability Statement

The reference list identifies the sources supporting this historical review. No new experimental dataset was generated. Historical works consulted through bibliographic records are marked accordingly.

Author Contributions

K.Y.: conceptualization and provision of source material.

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Ethics approval and consent

Not applicable. This article is a historical review and reports no new studies involving human participants, animals, or experimental plant material.

Competing Interests

No competing interests.

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