

Finally, the first four populations of *C. maxima* contains many and various carotenoid pigments. These can be utilized as supplement in animal feeds, mostly in those meant for fowl, in order to intensify the colour of carcass, egg yolk, skin and fat, as well as for provitamin-A source for any diet.

Rezumat

NEAMTU G., A.T. SZABO, DAN V., LUNG C., BLAJ O., 1984, Cercetări chemotaxonomice la plante superioare (XVI). Pigmenți carotenoidici în fructele unor soiuri locale de Cucurbita (în engleză). Not. bot. hort. agrobot. Cluj, XIV.43-48

S-a determinat conținutul în pigmenți carotenoidici la șapte soiuri locale de *Cucurbita*. În fructe s-a putut identifica numai pigmenți carotenoidici cu structuri iononice α - și β ; carotenoide hidrocarburice (α - și β -carotine), xantofile (criptoxantină, luteină, zeaxantină), respectiv epoxizi xantofilici (flavoxantină, eloxantină, mutaxantină, auroxantină, violaxantină, neoxantină). S-au găsit diferențe semnificative între soiurile locale examinate, diferențe determinate de cauze genetice sau de mediu.

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NOTULAE BOTANICAE HORTI AGROBOTANICI, 1984, XIV

GREGOR MENDEL AND THE FOUNDATION OF GENETICAL RESEARCH IN AGROBOTANY

VITĚZSLAV OREL

Abstract:

OREL V., 1984, Gregor Mendel and the foundation of genetical research in agrobotany. Not. bot. hort. agrobot., Cluj, XIV.49-52

The accepted principles in research on plant germplasm were first formulated by G. MENDEL (1822-1884), as a result of carefully planned hybridisation experiments carried out on *Pisum*. Research performed by the staff of the Mendelianum (Moravian Museum) demonstrates, that the discovery was not a "bolt from the blue" as commonly supposed, but deeply rooted in the Central European plant breeding traditions. It is proved, that the "Pisum Project" was elaborated for solving the basic problems regarding the formation and development of hybrids, fundamental for the advancement of agrobotany and applied biology. It is demonstrated, that the interaction of the experimental-inductive work of MENDEL, the plant breeder and the hypothetical-deductive method of MENDEL, the mathematician, was fundamental for the discovery.

Key words: G. Mendel, germplasm research, *Pisum*.

Adress: MENDELIANUM, Moravian Museum, Brno, Czechoslovakia

Mendel's scientific achievements were commemorated on different occasions in the past, and the relevant state of science was always the starting point for the evaluation. The fact is, that after 1900, Mendel's experimental approach in the research of heredity had a decisive role in the development of the new science - the genetics - which had the most powerful influence in applied botany and in biology as a whole.

In the history of genetics Mendel was sometimes lionised as a scientist who, in the seclusion of the monastery, alone elaborated

the theoretical background for the research of heredity. On the occasion for the Mendel Centennial in 1965, the Moravian Museum opened a memorial in the former monastery where Mendel lived and worked, and thus an institute was created for the systematic gathering and investigation of documents relating to Mendel and the development of genetics (1). New information accumulated till now allowed an examination of such fundamental questions as how Mendel came to his scientific idea and what he actually discovered (2).

The centennial anniversary of Mendel's death in 1984 falls in an era of extraordinarily rapid development, but the main results of the Pisum experiment appears in all relevant textbooks on genetics and biology. On the other hand, there still persist different interpretations of his theory and of the role of his research.

In the literature this heritage is mostly treated in a simplified way: the laws of heredity originate as a bolt from the blue. This picture has proved incorrect. An examination of Mendel's scientific activities in the context of the specific economic, social and cultural development of his native country, Moravia, illustrates that his research was rooted deeply in a long tradition of animal and plant breeding. Newly it has also been proved that Mendel started from the pioneer physiological research in procreation and fertilization and from the application of the methods of mathematics and physics to biology (OREL and MALATOVA, Ed., 1983).

After 1800 Brno became a thriving centre of scientific interest. The problems of the artificial selection (especially for sheep breeding) were formulated in Brno in 1812 and the topics of "artificial breeding and heredity" appeared as early as 1827 in academic teaching in Olomuc and later in Brno. After 1820 attention was also paid to the application of artificial fertilization in plant breeding. In 1850 Brno naturalists considered plant hybridisation a purely scientific problem. This developments were influenced by the enlightened abbot of the Brno Augustinians F.C. Napp (1792-1867) who formulated the most important problems of the breeding under following headings: What is being inherited ?, How is it inherited ?, How does the contribution of the two parents interact in heredity ? (1836-1837). In 1838 the same Napp announced a prize on breeding new varieties of currant bush through hybridisation, and in 1840 asked for an explanation of the role of chance in applying hybridization in fruit tree breeding. In 1843 Napp accepted Mendel as a novice in the monastery and backed his endeavour to study natural sciences: in 1851 he sent Mendel to study at Vienna

University where he learned methods in physics and chemistry which his Professor, F. UNGER recommended to his students to apply in research regarding procreation, fertilization, variation, evolution etc. A detailed examination proves that the Pisum research project was elaborated for solving such fundamental problems.

In preparing his research Mendel made full use of available knowledge in the field of plant hybridisation and plant breeding. In the Pisum research Mendel defined more precisely the findings of his precursors in plant hybridisation. Most remarkable, however, was his theoretical model of the transmission of hereditary factors, elaborated on the basis of methodological principles in physics and chemistry, including the new theory of probability. The carefully selected model of Pisum, reduced to single pairs of traits, enabled him to plan research, to check the results of the individual experiments, and to mathematize the theory. It is only now possible to prove, that his pioneer research regarding hybridisation and heredity has closely been connected with the controversial topics of procreation and plant fertilization. Mendel anticipated, that cells are carriers of the determinants of heredity, he ascribed the plant traits as hypothetical material units inside the cell, and was able to write that "propagation in phanerogams is initiated by the union of one germinal and one pollen cell into one single cell, which is able to develop into an independent organism through incorporation of matter and formation of new cells". In fact he first proved here hypotetic-deductively the process of plant fertilization with one pollen grain - a process which was explained by cytologists twenty years later!

On the basis of this presumption Mendel was gradually elaborating, testing and proving his hypothesis in a series of experiments with the aim of creating a new theory. The results of the interaction of the experimental inductive work of Mendel, the plant breeder, and the hypothetical-deductive method of Mendel, the physicist, was fundamental in the discovery of the basic properties of plant germplasm.

The question why Mendel's paper was so long neglected by biologists still remains open. We know now that the Pisum paper was quoted more often in the literature before 1900 than was assumed in 1965. Nevertheless, these quotations did not mean an understanding of his research. The reason of the neglect must be sought in the methodical innovations, which his contemporaries failed to recognize. His analytical methodology and mechanistic interpretation were in agreement with the general philosophical precepts of his time. His theory, however,

gained its revolutionary value only after 1900, when the Pisum paper, translated in different languages, marked a fruitful contribution to the development of genetics in the first half of the 20th century.

At the new level of knowledge Mendel's experimental approach instigated the elaboration of the concept of chromosomal heredity and later led to the elaboration of the principles of genetics of populations and finally to the synthetic understanding of the process of evolution, including such phenomena as genetic erosion or genetic sedimentation.

In the perspectives of germplasm research and future genetic manipulations, the achievements of G. Mendel are fundamental not only in the history of biological science in Moravia, but in the science of the world as a whole, comparable, in Central Europe, only with the discoveries of Copernicus, Kepler and Bolyai regarding the science of space.

Rezumat

OREL V., 1984, Gregor Mendel și începuturile cercetărilor genetice în botanica agricolă. Not. bot. hort. agrobot., Cluj, XIV. Principiile, ce stau și la baza cercetărilor referitoare la resursele genetice pe plan mondial au fost formulate prima dată de G. MENDEL (1822-1884) ca rezultat al unor experiențe riguroase de hibridare la Pisum sativum. Cercetările efectuate de colectivul din Mendelianum (Muzeul Moraviei) au demonstrat că geneza acestor descoperiri nu reprezintă o enigmă în istoria științei, cum se presupunea de obicei până în prezent ci este adânc ancorată în tradițiile ameliorării plantelor. S-a dovedit că planul experimental cu Pisum a fost conceput în vederea rezolvării unor probleme fundamentale cu caracter practic. Se arată că interacțiunea metodelor experimental-inductive ale lui MENDEL ca ameliorator cu cele ipotetico-deductive ale lui MENDEL ca matematician-fizician au avut o importanță majoră în descoperire.

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THE PISUM MODEL

A.T. SZABO

Abstract:

SZABO T.A., 1984, The Pisum Model. Not. bot. hort. agrobot Cluj., XIV, 53-58. Connected with the centennial anniversary of the death of Gregor Mendel, an important achievement of Pisum genetics is briefly discussed: the Pea Model proposed by S. BLIXT and J.T. WILLIAMS (1982) for use in computerised documentation of plant genetic resources.

Key words: genetic resources, computer, Pisum, history of biology

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The first basic laws of inheritance were stated by GREGOR MENDEL based on experimental results obtained with Pisum sativum (5). There has frequently been emphasized, that the genius of MENDEL is demonstrated, after all, by the choice of the pea plant as the main experimental organism. This statement is important for the present day research and reflects the impact of early Pisum genetics in the history of biology. Today, especially after the lectures of the last Mendel-Symposium (6) we realize more clearly the greatness of this scientist, who first connected correctly the characters of an organism to material factors hidden in gamets. Ever since its rediscovery, this knowledge has been an important part of our culture (1, 4, 8).

The new principles expressed in a new book of basic importance (2) are mainly based on results in Pisum genetics too. These principles may be regarded as the beginning of a new period in the history of

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