ECOCYCLES
ISSN 2416-2140

OPEN ACCESS
Scientific journal of the
European Ecocycles Society

Ecocycles, Vol. 8, No. 2, pp. 1-3 (2022)
DOI: 10.19040/ecocycles.v8i2.228

Historical context of the origins of the biological-ecological approach to plant protection

Tamas Komives

Plant Protection Institute, ARC, ELRN, Budapest, Hungary
komives.tamas@atk.hu

Abstract – This Editorial paper is to introduce two Research Articles in this issue of Ecocycles. The first one is an edited and annotated translation of a ground-breaking study originally published by Dr. Barnabás Nagy (a young scientist working at the Plant Protection Research Institute of the Ministry of Agriculture of Hungary) in 1957 (Nagy, 1957). Unfortunately, the paper appeared only in Hungarian (without its title and abstract translated to English) in a relatively obscure local journal that existed for less than 15 years and is not available online today. The excellent English translation of Nagy's article (Nagy et al., 2022, translated, edited, and annotated by Dr. Béla Darvas and Dr. András Székács) shows that Nagy's ideas were revolutionary in every respect and way ahead of their time. His concept was to move the theory and practice of plant protection away from chemistry (i.e., spraying with pesticides) to an approach based on biology and ecology. Nagy's paper is not only innovative and scientifically visionary but is an excellent reading, too. The second paper, written by Székács and Darvas (2022) discusses the current status of ecological plant protection and how it is influenced by the works of Nagy and his contemporaries in Hungary and abroad. The authors pay special attention to the changing attitudes of society (the general public and the government agencies) related to the persistence and environmental fate of pesticides, their residues, and chronic health-damaging effects. These changes are evident in the rapid progression and expansion of ecological (organic) farming worldwide and its support in the European Green Deal. In conclusion, I strongly recommend Nagy's seminal work to anyone interested in plants and protecting them against harmful pests. Furthermore, I express my deep gratitude to Drs. Darvas and Székács, who responded positively to our invitation to translate it and make it available to scientists, educators, and the general public and gave an excellent overview on the outlook of ecological plant protection today.

Keywords – ecological plant protection, English translation of the avant-garde study of Barnabás Nagy, ecology, chemical control, parasitoids, environmental protection

Received: June 25, 2022 Accepted: July 13, 2022

In this article, I would like to introduce two research articles to our readers, both published in the current issue of *Ecocycles*. The first one (Nagy et al., 2022) is an edited and annotated translation of the study initially published in 1957 by Barnabás Nagy[1] (Nagy, 1957) (a young scientist working at the Plant Protection Research Institute of the Ministry of Agriculture of Hungary, Budapest). The second paper was written by Székács and Darvas (2022). It discusses the current status of ecological plant protection and how it has been influenced by the works of Nagy and his contemporaries in Hungary and abroad.

[1] Barnabás Nagy was born in 1921, at Szamoskér, a small village in Eastern Hungary. He studied at the University of Debrecen (1939–1942), and graduated at the University of Kolozsvár (then Transylvania, Hungary, today Cluj-Napoca, Romania) in 1944, in zoology. For 64 years (1950-2013) he worked for the Plant Protection Institute (Budapest, Hungary), as a research entomologist in different positions, including Head of the Department of Zoology of the Institute between 1970 and 1978 (Szövényi et al., 2020).

BACKGROUND

In 2001, the Plant Protection Institute celebrated the 80th birthday of Professor Emeritus Barnabás Nagy. Despite his advanced age, Dr. Nagy worked hard in the Institute, studying the lifestyle of locusts and precisely predicting their reappearance in the Carpathian Basin (Nagy, 1995 and 2006), and related this to climate change. Most of us at the gathering were aware of his forward-thinking publication in 1957, emphasizing the importance of biology and ecology as the appropriate scientific modus operandi in plant protection. When I asked him about this paper, he said that in the 1950s, it was just an idea he had been toying with for years. To his misfortune, his highly innovative idea had very little or no recognizable practical relevance – just the opposite that was expected as an outcome of a study at a government institution. Since he was also aware that his new approach was not only novel but far-reaching, he decided to share it with his Hungarian colleagues in the form of a concept paper.

Regrettably, without having responses to this article, he decided to move on – but continued his work under an ecological umbrella. During our conversation, I also asked him if he would be interested in translating his old paper to English and claiming priority for his concept. He declined and said it would take too much effort from him to put his original idea into a 21st-century perspective.

After the passing of Professor Nagy in 2020, I asked Professor Béla Darvas and Professor András Székács if they would be interested in translating Nagy's paper of 1957 into English and having it published in *Ecocycles*. Thus, after more than sixty years, Nagy's scientific achievement would be available worldwide to scientists, educators, and the general public. I would like to express my deep gratitude to both of them for their positive response to my invitation. I would like to add that Dr. Darvas and Dr. Székács not only translated Nagy's paper but also contributed as editors by adding

1) an abstract and keywords to the manuscript,

2) annotations in the form of footnotes, and

3) formatting the paper and its references to the layout requirements of *Ecocycles*.

Performing these tasks demanded many hours of hard work from them, considering that

1) the scientific terminology related to Nagy's paper has undergone profound changes since 1957: the translators had to address clarifications in nomenclature and taxonomy in 25 footnotes altogether, and

2) in his original paper, Nagy provided the references in strongly abbreviated forms (without titles and mentioning only the first author). Therefore, the translators had to identify the citations correctly (this was especially difficult in the case of the papers published in Russian), whenever possible, with their DOI numbers.

THE CONCEPT OF NAGY ON ECOLOGICAL PLANT PROTECTION

In his paper of 1957, Nagy identified the prevention of insect gradations as an essential task of pest control. He also stated that while chemicals could help destroy gradations, the ultimate goal is prevention, which can only be achieved through methods based on ecological and coenological investigations. Furthermore, he warned about the harmful side effects of widespread pesticide use on non-target, beneficial insects and on humans and farm animals – five years before the publication of Silent Spring (Carson, 1962).

After thoroughly scrutinizing the state of plant protection against pests in the 1950s, Nagy concluded that pesticide-based technologies are not only hazardous for the environment and human health but cannot hinder outbreaks of pest gradations. Therefore, he urged the intensification of research on animal populations living on plants (including parasitoids and predators). These studies could identify the abiotic and biotic factors influencing pest populations and allow decisive measures to prevent gradations.

Over and above that, Nagy concluded that "*the relative proportions of pesticide development, on the one hand, and entomological ecological research, on the other hand, must change in the near future*."

Nagy also remarked that the selectivity of pesticides needs to be improved together with new methods of application (e.g., baits) that spare the beneficial organisms from the direct effects of the toxicants. Additionally, he examined
1) the potential risks of repeated pesticide applications and suggested that these may lead to the selection of resistant pest populations, and
2) the importance of biological research for managing pesticide resistance.

ECOLOGICAL VS. INTEGRATED PEST MANAGEMENT

During the decades, the scientific world has accepted the concept of ecological plant protection. Since the millennium it has gained significant momentum that is still rising (Figure 1) – although the idea is still not attributed to Nagy personally. The paper of Székács and Darvas (2022) analyzes the current status of agroecology and the impact of biological and ecological sciences on the evolution of the concept of sustainable agriculture. Their paper presents a precise scientific definition of ecological pest management and identifies the overlaps and differences with the generally accepted method of integrated pest management. Furthermore, the authors discuss the approach of organic agriculture (i.e., a complete ban on synthetic chemicals) and the importance of ecology-based considerations and objectives in the European Green Deal.

CONCLUDING REMARKS

In summary, I believe that the translation of Nagy's paper from 1957 and the considerations of Székács and Darvas in

the following publication are essential contributions to plant protection and agroecology.

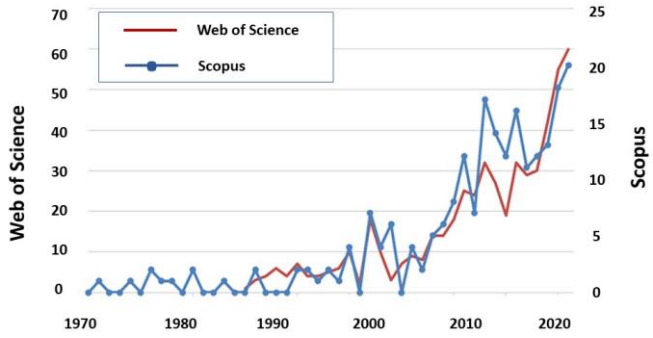

Figure 1. The number of papers published on *ecological "plant protection"* (Scopus) and *ecologic* "plant protection"* (Web of Science) from 1974 to 2021 (data were collected from the databases on July 20, 2022).

I would also like to express my hope that Nagy's original concept and his suggestions to emphasize agroecological research will receive the worldwide attention they deserve, being as compelling today as they were 65 years ago.

OPEN ACCESS STATEMENT

ACKNOWLEDGMENTS

We acknowledge with thanks Dr. Balazs Barna, Dr. Zoltan Bozso, and Dr. Gabor Gullner (all of the Plant Protection Institute, ARC, ELRN, Budapest, Hungary) for helpful discussions.

REFERENCES

Carson, R., 1962. Silent Spring. Houghton Mifflin Company, Boston.

Nagy, B., 2006. Decreasing locust outbreaks in the Carpathian Basin. Acta Phytopathol. Entomol. Hung. 41, 177–188. DOI: 10.1556/aphyt.41.2006.1-2.16

Nagy, B., 1957. The importance of biological vision in plant protection against pests (in Hungarian). Curr. Issues Plant Prot. 1957, 1–10.

Nagy, B., 1995. Are locust outbreaks a real danger in the Carpathian Basin in the near future? J. Orthoptera Res. 143–146.
DOI: 10.2307/3503469

Nagy, B., Darvas, B., Székács, A., 2022. The importance of biological vision in the control of plant pests. Ecocycles 8, 4–11.
DOI: 10.19040/ecocycles.v8i2.221

Székács, A., Darvas, B., 2022. Attempts for undoing the ecological incompatibility of agricultural technologies: from ecological pest management to agroecology. Ecocycles 8, 12–22.
DOI: 10.19040/ecocycles.v8i2.222

Szövényi, G., Puskás, G., Szőcs, G., 2020. Commemoration of Dr. Barnabas Nagy, a research entomologist on a mission to serve biodiversity and agrozoology. Acta Phytopathol. Entomol. Hung. 55, 249–258.
DOI: 10.1556/038.55.2020.024