FOLIA PARASITOLOGICA (PRAHA) 17: 97—101. 1970.

Twenty-five Years of Modern Czechoslovak Parasitology

In 1970 the Czechoslovak Socialist Republic celebrates the twenty-fifth anniversary of its liberation by the Soviet Army. The unprecedented support and understanding accorded to science in our socialist country is reflected in the fact that Czechoslovak parasitology as a science could develop and achieve a number of internationally acclaimed results. The development of parasitology in the past twenty-five years in Czechoslovakia is closely associated with the establishment of the Czechoslovak Academy of Sciences, Slovak Academy of Sciences, development of zoological departments at universities, especially at natural sciences and veterinary faculties and in research institutes of the Ministry of Public Health and Ministry of Agriculture. The development of Czechoslovak parasitology has been considerably influenced by the Soviet parasitological schools.

A number of publications in protozoology appeared which were concerned with parasitological laboratory problems (trichomoniasis, intestinal and oral protozoans), with pathogenesis of diseases etc. Of primary importance were papers on vaginal trichomoniasis, determination of sexual character of transmission, dynamics of discharge from genitals (vaginal microbic pictures and proposed new drugs based on experimental work). In the research of toxoplasmosis of man and animals considerable team studies were carried out, which received international response. Skin test with toxoplasmin and diagnostic serological tests were elaborated which have been widely applied in public health service since. Problems concerning the relationship of toxoplasmosis to pathogenesis of some intraocular inflammations, diseases of lymph nodes and some forms of congenital disturbances were solved in cooperation with clinics. Diagnostic methods made it possible to introduce the therapy or preventive therapy to clinics. A major discovery with considerable epidemiological import was the finding of amoebas causing meningoencephalitis in man. The original studies on the ultrastructure of gregarines, microsporidia and some protozoan parasites of fishes received a considerable response.

The discovery of *Pneumocystis carinii* as the causative agent of frequently fatal plasmocellular intersticial pneumonia of infants aroused interest in the world and incited research work in other countries. Pneumocystosis was systematically studied in its relation to epidemiology and to other lung diseases of infants. The findings in free-living insectivores and rodents confirmed the suspected reservoirs of this infection in nature and made it possible to reveal in an original way the sources of epidemics among infants. The location of the infection in natural foci was demonstrated.

No less important studies were concerned with systematic research of leptospiroses, their natural foci, types of natural foci and antigen structure of leptospirae.

The studies on the helminthofauna of domestic and wild vertebrates in the territory of Czechoslovakia were almost completed. Diagnostic coprologic methods for the detection of helminths of sheep, cattle and wild ruminants were elaborated. An extensive research on parasitic worms of sheep and cattle was conducted, elucidating the factors affecting cycles of invasion, development of parasitic worms in pastures, resistance of their developmental stages and seasonal dynamics. These studies were a basis for the prevention of helminthoses of sheep and cattle and partly of wild ruminants. The mutual exchange of helminths among domestic and wild vertebrates was also studied and the conditions under which this exchange usually takes place, were determined.

While studying the adaptation of worms to unusual hosts it became evident that in some cases the concept of specificity of helminths should be revised because under certain ecological conditions even some so-called „strictly specific helminths" may transfer to unusual hosts, even to mass extent. In this connection the influence of food composition upon the occurrence of certain species of hosts or groups of hosts was studied. The results of these studies fully correspond with the suppositions of Dogel' that the food composition affects the formation of helminthofauna in individual host species.

Great attention was paid to the helminths of fishes. Apart from a number of description of new species, especially from the class Monogenea and their distribution in Czechoslovakia, monotypic populations of monogenetic trematodes were experimentally studied.

It was ascertained that the relationship of invasive larvae to resorvoir host need not always be a parasitic one, as supposed by Skrjabin and Schultz or Baer, and that it can have other forms. Invasive larvae can behave as neutral foreign bodies. This phenomenon was therefore called „reservoir habitationism".

In the last ten years studies were developed concerning the tissue reaction to parasite activities, and were accompanied by studies of histology and histochemistry of the parasites. This research made it possible not only to elucidate the mechanism of pathogenous effects of parasites, but also their histologic diagnostics to an extent which was not achieved before. This research resulted in studies on the pathogeny of some cestodes of fowl, some chiggers and mange mites. Exact histochemical analysis of sclerites facilitated the diagnosis of remains of linguatula, echinococcus,

cysticercus and pin-worms in human organs and their differentiation from pseudoparasitic structures. The comprehensive studies on brain cysticercosis showed how the location in an atypical organ changes usual morphology of the parasite, and resulted in the convincing identification of racemose cysticercus in Europe as proliferating bladder of *Cysticercus cellulosae*. In comparing the cysticercus larvae new knowledge was also obtained on the ultrastructure of its bladder wall. A histochemical study of cercariae of some trematodes elucidated the character of their complicated glandular structures, the origin of metacercaria cyst and the relationship of its structure to ecological conditions.

From the results obtained in practice the most notable are: antiparasitic baths of fishes, control of fascioliasis, preventive measures against *Fascioloides magna* which parasitizes wild ruminants and against syngamosis in turkey farms etc.

The most intensively studied group of parasitic mites during the last twenty-five years were mainly ticks. Knowledge was obtained on species composition, the host range of most important tick species, seasonal dynamics, developmental cycles, the most important aspects of bionomy, the role of ticks in natural foci of diseases and their relationship to different pathogenous agents. Ticks were demonstrated to be vectors of pathogenous agents of some diseases, primarily tick-borne encephalitis and piroplasmoses. Effective measures were elaborated for tick control. Our methods for the preparation of tissue culture from ticks received a world-wide response. A successful study was developed on the superfamily Gamasoidea, the relationship of these mites to different hosts, their bionomy, phylogeny etc. A detailed knowledge was also obtained on chiggers, especially on the ecology of nymphs and adults and on synantropic mites of the superfamily Tyroglyphoidea, mites parasitizing insects and the relationship between mites and insects. For the research of ecology of parasitic arthropods in free nature adequate continuous measurement methods were developed and first results obtained concerning the effects of temperature and humidity on ectoparasites in the nests of their hosts.

From insects a considerable attention was focused on mosquitoes, primarily on their faunistics, distribution, bionomy and epidemiological importance. Most data obtained were summarized in a monograph concerning the mosquitoes in Czechoslovakia. Sufficient knowledge was obtained on the species composition of black flies and horseflies, especially on the species of great veterinary importance. The problems in the studies on synecology and biocenology of synanthropic and synbovine Diptera were solved in an original way, using also materials from Austria, Hungary, Albania, Yugoslavia and Bulgaria. Many important ecological data were accumulated on lice parasitizing small mammals and on the fauna of Mallophaga. Fleas were dealt with in a monograph and attention was also paid to their ecology and geographical distribution.

In the research of medically important insects, which resulted in a book publication, special attention was given to the application of insecticides and repellents. The production of the well-tested Nera emulsion was proposed and of the first

compendia on insecticides against medically important arthropods was gradually developed and resistance tests were introduced into practice.

Very good results were obtained by Czechoslovak parasitologists in the research of cattle grub (hypodermosis). Not only the biology of these parasites was elucidated under conditions in various parts of Czechoslovakia, but also an effective drug (Hypocid) was found for their control.

Special attention was paid to the research of natural foci of diseases (according to the theory of E. N. Pavlovsky). The original theory on the circulation of some diseases in intact nature was applied to the conditions of densely populated areas by means of parasitological and biocenological analyses of foci in central and south-eastern Europe. In this way, for example, the problem of meningoencephalitis epidemic near Rožňava (eastern Slovakia) was successfully solved, as well as some problems of tick-borne encephalitis, tularemia, leptospiroses and other diseases characterized by natural foci. The application of a coordinated method in this research proved beneficial, when other specialists, besides the parasitologists, participated in it: virologists, microbiologists, mycologists, epidemiologists, zoologists, botanists etc. Similar investigations were started in Hungary, Poland and the GDR, while joint expeditions were organized in Bulgaria, Yugoslavia and Hungary.

The research of vectors and reservoir animals as components of biocenoses of natural foci yielded many new data, especially new knowledge on arboviruses. A new arbovirus Ťahyňa was detected in and isolated from mosquitoes of the genus *Aëdes* and another new virus Čalovo from mosquitoes of the genus *Anopheles*. Their elementary foci had been studied for long periods. New isolations of the viruses: Tribeč, Kemerovo, Uukuniemi were also made from Ixodid ticks and were investigated from ecological and epidemiological aspects. Apart from the well-known natural focus diseases, some mycotic infections of man, primarily adiaspiromycosis caused by *Emmonsia crescens*, was demonstrated to be of natural focus character.

Some phenomena of natural focality of diseases were elucidated under geographical conditions of central Europe, such as the synanthropy of reservoir animals, their migration, spatial arrangement of elementary foci, and the classification of natural foci of tick-borne encephalitis was presented. In addition, the methods used in the research of natural foci and their surveillance, were further developed, taking into account the main trends in parasitology and medical ecology.

The parasitological research, especially the research of natural foci of diseases, was also conducted during expeditions abroad where the experience obtained in the home country, could be well applied. For example in the past years several important coordinated expeditions were organized by the Institute of Parasitology, Czechoslovak Academy of Sciences, into the mountains of the Balkan peninsula, Afganistan, Pakistan, Mongolia etc. These field studies yielded not only remarkable results in the knowledge of biology and ecology of parasites, but also supplied valuable indications to epidemiologic surveillance. Czechoslovak parasitologists

carried out important investigations in Cuba, and in cooperation with their Cuban colleagues laid foundations to the knowledge of parasites of domestic and wild animals in this geographically very interesting island. This knowledge made it possible to control parasitic diseases of paramount veterinary importance under local conditions.

During the past years a number of parasitological journals and volumes of collected papers came into being in which parasitological communications were published. The journal Folia parasitologica, which is the continuation of the former annual volume Československá parasitologie I—XII, is issued by the Institute of Parasitology, Czechoslovak Academy of Sciences in Prague. The volumes Helmintologia and Acta Helminthologica are published by the Helminthological Institute of the Slovak Academy of Sciences in Košice, appearing regularly once a year each.

An important step in the development of Czechoslovak parasitology was made in 1959 when the Czechoslovak Parasitological Society was established. Today it has 180 members specialized in most varied parasitological fields. This institution also participates in the organization of parasitological seminars, symposia and conferences which were quite numerous in the past and had local and international character.

In the past twenty-five years the Czechoslovak parasitological research centres demonstrated the importance of parasitology for the conditions of moderate zone and showed that due to the high standard of all disciplines they can qualify as equal partners in the international scientific collaboration.

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