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The Geographical Range and Distribution of the Genus *Apis* L. Bees

Zasięg i rozmieszczenie geograficzne pszczół rodzaju *Apis* L.

Географическое распределение пчел рода *Apis* L.

This paper is an attempt to present the distribution of the genus *Apis L.* bees cartographically. This subject seems to be interesting and useful because of the up to date lack of a similar elaboration.

There are four species of bees of the genus *Apis* L. (Fig. 1), namely: 1) the honey bee — *Apis mellifica* L., 2) the Indian bee — *Apis indica* F a b., 3) the giant bee — *Apis dorsata* F a b., 4) the dwarf bee — *Apis florea* F a b.

Each of the mentioned species has a certain range of occurrence conditioned mainly by physico-geographical factors. The climatic differences and floristic individualities, connected with the change of the geographical latitude, led to the formation of significant morphological differences in the structure as well as in the colouring of the bees. Even subspecies and geographical breeds have been formed.

From among all species of bees the honey bee — *Apis mellifica* L. is the most interesting from the economical point of view (Fig. 2 and 3).

The benefits from the honey bee are widely known. Apart from producing honey, wax, poison (which has curative properties) and bee milk (which undoubtedly has medicinal properties and is the subject of further research), this bee contributes to the increase of seed and fruit harvests by pollinating floral plants. It is in pollination that the bee plays a decisive role (17). The second place in this respect is held by the bumble-bee and then by other insects (17). It should be mentioned that the geographical distribution of some of the varieties of plants is dependent on the occurrence or lack of bees.

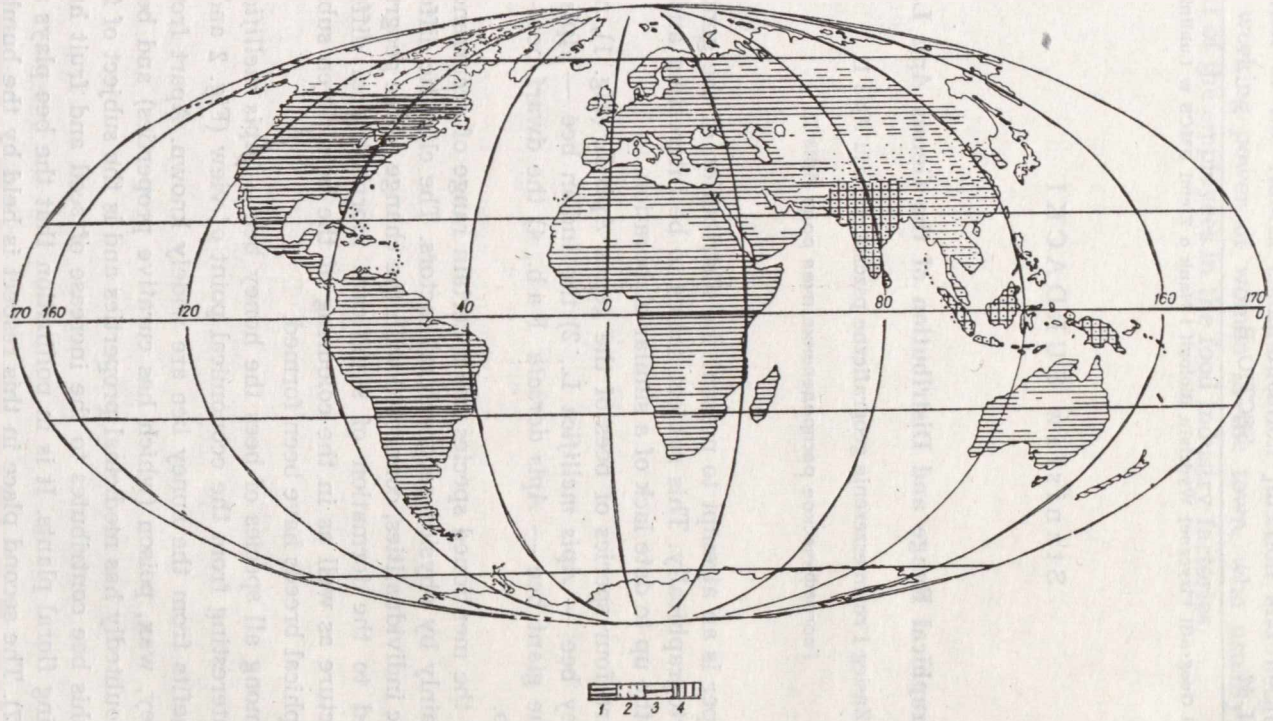

Fig. 1. 1 — the range of the honey bee, *A. mellifica* L.; 2 — range of the Indian bee, *A. indica* F a b.; 3 — range of the giant bee *A. dorsata* F a b.; 4 — range of the dwarf bee *A. florea* F a b.

In consequence of introducing bees to other continents and islands by European colonists, the cultivation of formerly unknown plants developed there. The clover (*Trifolium* L.), may serve as an example, which after being brought from Europe to New Zealand, did not yield there until the bee and the bumble-bee were introduced to these islands. Also in the New Zealand horticulture many new varieties of flowers such as: violets (*Viola* L.), crocuses (*Crocus* L.), primroses (*Primula* L.), appeared, which before the introduction of honey bees and bumble-bees could not reproduce there, because the flowers of these varieties are so adapted in their structure to pollination by bees, that they can not produce seeds without their participation (14).

The honey bee basically belongs to wild forms. For whole centuries the half domestic conditions of its life hardly caused any changes in it. Even now there are regions inhabited by forms wildly living, e.g. bees of the mountainous Taiga, recently discovered in Ural, the Biserta and Szalinsk region of Swierdlowsk district.

The honey bee most probably comes from the Near East. Its original habitats were in West Asia, Europe and Africa (5). In consequence of the economical activity of man the honey bee spread over the whole world with the exception of the Arctic, Antarctic as well as Tundra and full desert regions.

The distribution of the honey bee subspecies is connected with the ecological differentiation of the area. For example, South and Subtropical Africa is inhabitated by the South African *Apis mellifica capensis* Eschaltz. and the African bee — *Apis mellifica adansoni* Latr. Large areas of the eastern part of South America, apart from the European bee, is occupied by the African bee *Apis mellifica adansoni* Latr. This subspecies was brought to the Brazilian Upland in 1954 (16).

Despite the fact that the African bee is very agresssive, its introduction was decided because of its large productivity. Brazilian research showed that the African subspecies can be acclimatized there and most probably will fulfil the hope set on it.

The African bee exceeds all other subspecies as regards production, e.g. it is nearly twice as much productive as the Italian bees and nearly four times as the Central European. In some cases individual African bee families produce 5 to 10 times more honey than the remaining subspecies.

African bees acclimatized in Brazil will allow to stop the import of honey in the future. Up till now Brazil imports about 600 tons of honey yearly in spite of good natural conditions for the development of bee-keeping.

Though the African bee is much smaller than the European forms

(e.g. Italian), however, it appeared possible to cross it with the Italian and Central European bee. This was performed in Brazil. In result, cross-breeds which were similar to the milder parent as regards aggressiveness were obtained.

In Madagascar and neighbouring islands, the Madagascan bee — *Apis mellifica unicolor* Latr. lives, which has the darkest colouring of all bees.

In Egypt and Sudan the Egyptian bee — *Apis mell. fasciata* Latr. occurs. It is grey in colour and has similarly coloured strips on the abdomen. It is also distinguished by the fact that it does not propolize the cracks inside the nest.

In the region of North Africa, situated near the Mediterranean Sea, the Algierian bee — *Apis mell. intermissa* But. Reep. is widespread. This bee is similar in some respects to the Egyptian bee. The trunk and first three rings of the abdomen are gold and divided by rather thick whitish tomentum bands. The *Apis mell. intermissa* is somewhat smaller than the European breeds and besides it builds somewhat smaller cells. When introduced into the honey-combs of Polish bee, it produces offsprings similar to ours as regards size. It does not propolize the nest. These bees are very aggressive and this is most probably the reason why they are not wide-spread in Europe.

In Cyprus the Cyprian bee — *Apis mell. cypria* Pollm., occurs, which, as regards its morphology, is similar to the European bee in a large degree. It is distinguished by a somewhat longer tongue than that of a bee living further to the north and by a lemon-yellow colour which is the strongest in the Queen bees and drones. About 1870, it was brought from Cyprus to Czechoslovakia and neighbouring regions for a trial. These trials did not give positive results because of the negative utilization features and large aggressiveness.

In the high mountains of the Caucasus the high mountain Caucasian bee — *Apis mell. caucasica* Gorb. occurrs. It is dark, covered with light grey hairs and somewhat similar to the European bee. A different species lives in the lower Caucasian regions. The Caucasian bee, colourful and wide-legged, is widespread there. It is similar to the Near East group of bees. The Crimean bee *Apis mell. taurica* Alpatov also belongs to the Caucasian group of bees (5, 7).

The Caucasian bees play a large economical role. They are excellent pollinators of the red clover, for they have longer tongues than those of the honey bee. They were introduced to Poland, and experiments revealed that our climatic conditions are fully agreeable to them. In Poland the Caucasian bees also distinguish themselves by a large honey yield. Cross-bred with our Polish bee they maintain the large honey yield,

but only in the first generation. The second and succesive generations are unfortunately sometimes less honey yielding than our native bees and besides, negative features appear in them, among others, at times, a great aggressiveness.

In Europe four subspecies of the honey bee are mainly wide-spread: 1) the typical honey bee — *Apis mellifica mellifica* L., 2) the Italian bee — *Apis mell. ligustica* S p i n., 3) the bee of Carniola — *Apis mell. carnica* P o l l m., 4) the steppe bee — *Apis mell. acervorum* S c o r.

Table 1. World resources of bee families and the production of honey in 1960 in even sums (1, 11)

Continent	Bee families in thousands	Honey production
Europe (without USSR)	12 500	110 000
USSR	10 000	100 000
Asia (without USSR)	4 000	30 000
Africa	8 000	45 000
North America (without Canada)	5 500	108 160
Canada	300	11 970
Central America	1 500	20 000
South America	1 500	26 000
New Zealand and Australia	500	21 000
Total	43 800	472 130

The typical honey bee ranges to the North as far as the Kola peninsula. Russian researchers have brought the European bee many times to the Murmańsk region with the aim of acclimatization.

It is interesting that in regions near to us the range boundary between the Northern type bee and the Southern type bee occurs. The mentioned boundary runs more or less along 51° latitude North, that is along nothern ridge of the Wołyń (Volhynia) Upland and the south extreme of the Volhynia Polesye (6). Further to the West the Central European bee occurs.

The typical honey bee was exported to South America in 1859, where it became widely spread but later forced out by the cross-breed of the Italian and Cyprus bees. From the cross-breeds of the subspecies a bee of a yellow-golden colour was selected. This cross-breed is also widespread in South America and partly in India (Fig. 2). The typical honey bee was also exported to Australia in 1862 and forced out the local species. A

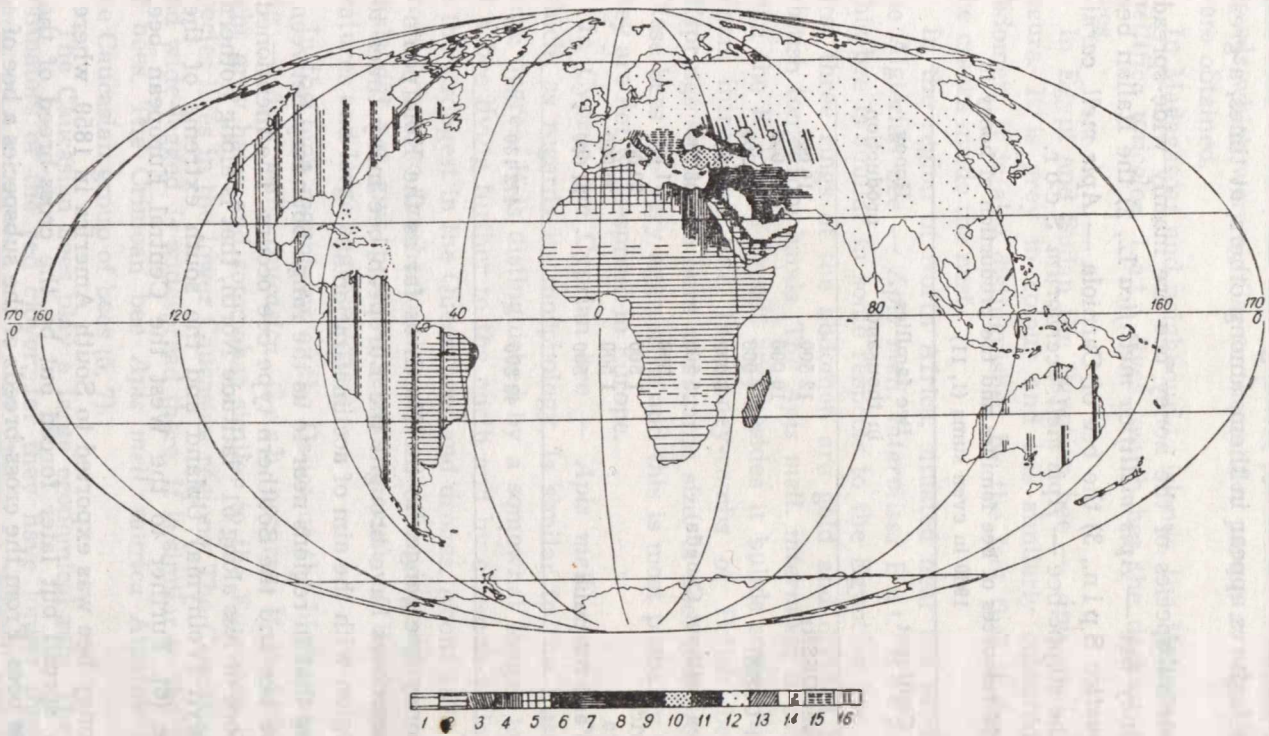

Fig. 2. The distribution of subspecies and geographical forms of the honey bee — *Apis mellifica* L.; 1 — South African bee *A. m. capensis* Eschaltz., 2 — African bee *A. m. adansoni* Latr., 3 — Madagascan bee *A. m. unicolor* Latr., 4 — Egyptian bee *A. m. fasciata* Latr., 5 — Algerian bee *A. m. intermissa* But., 6 — Syrian bee *A. m. syriaca* But. Reep., 7 — Persian bee *A. m. meda* Scor., 8 — Cyprian bee *A. m. cypria* Pollm., 9 — Caucasian mountain bee *A. m. caucasica* Gorb., 10 — Caucasian lowland bee *A. m. remipes* Pall., 11 — Crimean bee *A. m. taurica* Alp., 12 — the true honey bee *A. m. mellifica* L., 13 — Italian bee *A. m. ligustica* Spin., 14 — the Italian bee crossed with the Cyprian, 15 — Carniolica bee *A. m. carnica* Pollm., 16 — steppe bee *A. m. acervorum* Scor.

selected yellow-golden bee was later introduced to this continent from the USA.

The Italian bee is distinguished by its yellow-lemon colour on part of its abdomen. Its range is limited to the Appenines Peninsula. The original nothern boundary of this subspecies reached the Alps. Later the range changed because of the exportation of this to other regions. In Poland the Italian bee spread from the times of Dr Jan Dzierżon (about 1853) and was crossbred with our typical honey bee. The cross-breeding of the Italian bee with local breeds occurred in other countries such as: Germany, Switzerland, Austria, Yugoslavia, Czechoslovakia etc. (5).

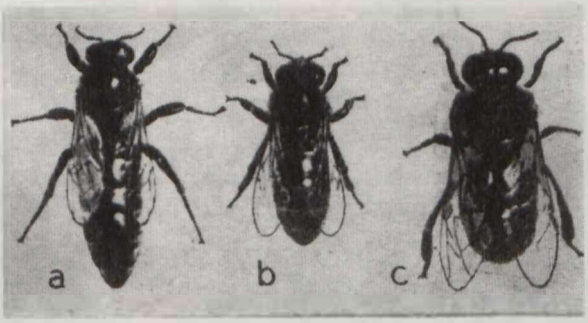

Fig. 3. The honey bee *Apis mellifica* L. (8); a — mother, b — worker, c — drone

The Carniolica bee, darkly coloured, is somewhat lighter in colour than the Northern-European bee and has some characteristics similar to those of the Italian bees. It occupies the Balkan peninsula, South-east Alps, the area of Czechoslovakia, the Carpathians Mountains, the South Poland and, moreover, Rumania, Bessarabia etc. This bee is known for its non-aggressiveness.

The steppe bee lives in the regions of former stepps of Podolia and Ukraina. It has adjusted to life in habitat without forests, making its nests in the ground holes. According to Skorikov (1929), it is shorter than the forest bee but has a longer tongue, longer wings and limbs (cit. 5).

2. The Indian bee — *Apis indica* F a b. (Fig. 1), called the medium Indian bee, is somewhat smaller than the European honey bee and is very widespread. Apart from India, Indo-China, Malayan Archipelago islands and other Pacific Ocean islands, it lives in Korea, Manchuria, China, Japan and in the Far East, and often in the Khabarovsk territory of the USSR. In natural conditions it lives in tree trunk hollows, rock fissures etc. Its nest is composed of a few honey-combs placed parallelly to each other. The original, grub propolis differing from that of honey bee, is a charac-

teristic feature of this bee. Namely the opercula of (droma) cells with a grub have one aperture in the middle (Fig. 4 p. 11). In India this bee is bred in bamboo stumps placed in front of houses. This species is less suitable for economical aims, as it often leaves its nests together with all its provisions, that means, with honey, honeycombs, grubs etc. In the area of its expansions it forms a few subspecies.

3. The giant bee — *Apis dorsata* F a b. is an individual species, differ-

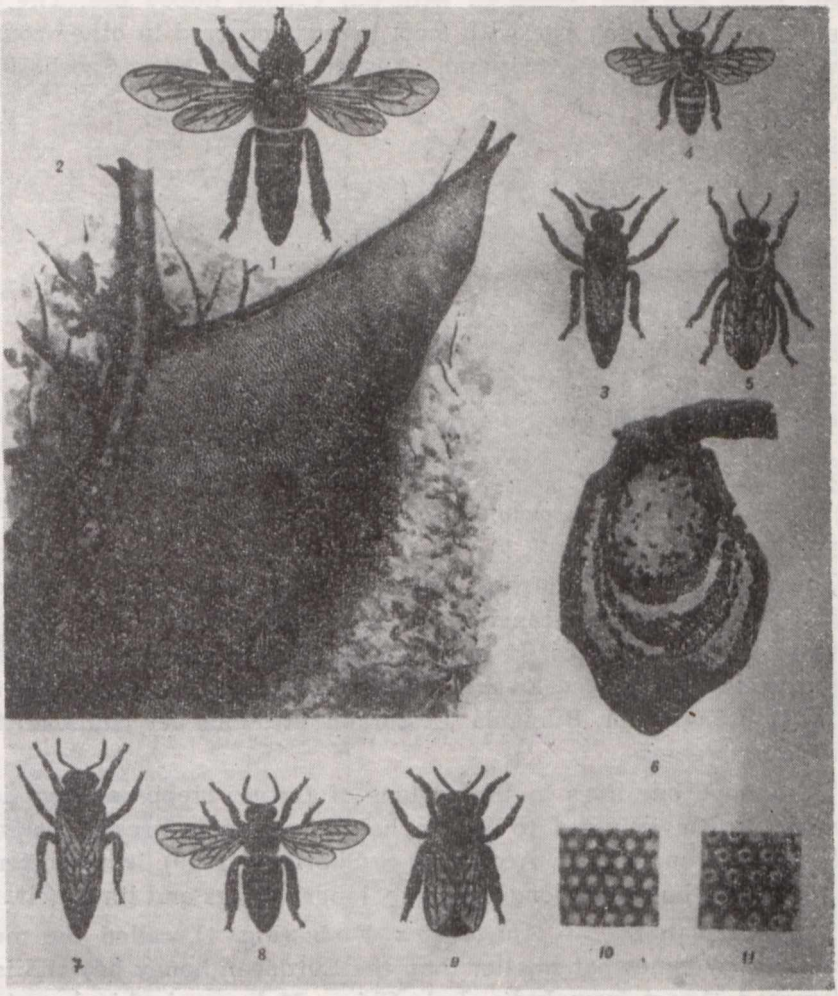

Fig. 4. Indian bees: 1 — mother of the giant India bee; 2 — honeycomb of the giant Indian bee on a tree branch; 3, 4 and 5 — mother, worker bee and drone of the medium Indian bee — *Apis indica;* 6 — honeycomb *Apis indica;* 7, 8 and 9 — mother, worker and drone of the small Indian bee; 10 — grub propolis of the medium Indian bee; 11 — drone grub propolis of a medium Indian bee with visible apertures on the apercles (13)

ing from all bees by the largest body size. The worker bees of this species are more or less as large as the Queen bee of our typical honey bee (5, 7).

The giant bee does not build nests inside its quarters, as the honey bee does, for example in tree trunk hollows and bee-hives, but it builds them in the open air with only one honeycomb, usually attached under tropical tree branches. Its favourite tree is the so-called "Tualang", the Malayan bee tree — *Coomparsia parviflora*. The size of the honeycombs reaches sometimes nearly one square meter (Fig. 4 p. 2).

The giant bee is widespread in India, in Indo-China and on the Sunda Islands. It occupies in the first place mountainous areas (Fig. 1). It is not domesticated and plays a small role in the production of honey.

4. The dwarf bee — *Apis florea* F a b. similarly to the giant bee builds single honeycombs under tree branches or in rock crevices, but its honeycomb is small, more or less the size of a human palm. The cells of the honeycombs are differentiated into: workers, drones and parent. The worker bee is half as small as our honey bee. It cannot be domesticated and therefore does not have a significant economical meaning. The dwarf bee has a range similar to that of the giant bee (Fig. 1). Its habitats are not in the mountains but in flat country and lowlands (5, 7).

The range of bees occurrence has aroused interest since a long time, e.g. the Greek historian Herodot (about 500—424 B.C.) was of the opinion, that area occupied by the bee reached more or less latitude 50—60°. The bee has occupied great areas for a long time. Such an opinion can be drawn from the fact that notes on papyri a few thousand years ago (about 4000 B.C.) say that the Egyptian bee was the symbol of Kinghood and the picture of an Idol. In Egypt, bee-hives of those times, in the shape of clay pitchers have been preserved up till now. Information on the breeding of bees, among others in Greece and Palestine come also from that time (8, 18). Undoubtedly in times of history man contributed to expanding the range of bees to the North and South in relation to the central regions of their original expansion.

The boundary of the distribution of bees in the North reaches more or less 64° latitude North and in the South more or less 52° latitude South (Fig. 1 and 2). The northern distribution range of the genus *Apis* on Fig. 1 is presented rather schematically. The drawing also does not mark the vertical range of bees in the mountainous areas (because of the lack of sufficient information).

The expansion of the bee is conditioned by the range of floral plants, which are the basis for collecting and accumulating food. The distribution of land plants is in turn dependent on the climatic and soil conditions. The polar regions lie beyond the boundary of the tree range. The vegetation period of yearly plants is too short there. The low temperatures and

accompanying them winds hinder the growth of plants and even more the discharging of nectare, necessary as food for bees. In these Northern regions the lichens and mosses which cover a significant area are of no use to bees (2, 10). In general, man inspired by economical gains decided the present distribution of bee subspecies. The economical significance of bees in the world is very large. First of all, crops increase owing to bees which pollinate corn plants (e.g. buckwheat), papilionaceous seed plants, vegetable plants, fruit trees and bushes etc. With the aim to increase crops by pollination the training of bees has even been applied. This has a significant meaning where plants are seldom visited by bees. The method of training is based on feeding the insects with aromatized syrup. This is widely applied in large areas of cultivated land, especially in the cultivation of flowers in the USSR. The economical advantages ir obtaining bee products, such as: honey, wax, propolis, milk, bee poison or pollen should be put in the second place.

When it comes to the number of bee families and also the production of honey or other bee products, it should be noted that we have not comprehensive statistical data for this branch of economy. Data exists for individual countries but this is not always accurate. The acquisition of a list of general data for individual continents and even more for the world is hard to obtain in practice. These data is changeable in individual years, depending on the atmospherical conditions occurring in the period of main utility and on the area of honey yielding plants.

More or less the global number of bee families e.g. in 1960 was 40—45 milion and the world honey production, 500 thousand tons (11). The general data concerning the number of bee families and honey production in individual continents in 1960 is presented in Table 1. In 1967, according to an uncomplete statistics, about 41 million bee families were noted in the world (9, 15). The number of bee families and average yield of honey from 1 family in individual countries is presented in Table 2, and the global production of honey, in Table 3.

When it comes to export and import honey, only a few countries are worthy special notice. The largest exporters of honey are: the Argentina (e.g. in 1960 — exported 18,900, in 1965 — 26,200, in 1971 — 14,100, in the period from I to XI 72 — 45,300, and in April 1973 — 5,600 tons), Mexico, The Chinese People's Republic, which e.g. in 1968 exported 24,100 tons (12).

The world importer of honey is the German Federal Republic (e.g. from I to XI 1972 imported 44 794.5 tons from 39 countries) which imports over 45000 tons yearly. The second world importer of honey is Great Britain. The average yearly import of honey to Great Britain in 1955—1959 was about 7 thousand tons and it increases every year. Japan is also

Table 2. The number of bee families and the average production of honey per family (4, 9, 15)

Country	Number of bee families in thousands	Average production of honey per hive in kg	Country	Number of bee families in thousands	Average production of honey per hive in kg
USSR	10,600	10.0	Portugal	473	
USA	5,517	23.0	Australia	450	41.0
China	3,000		Austria	440	
Ethiopia	1,500		Canada	333	45.0
Spain	1,400	10.0	Marocco	313	
Turkey	1,380		Switzerland	280	7.0
Romania	1,309	10.0	Denmark	270	
Poland	1,200	9.0	England	220	7.0
France	1,200	10.0	Japan	210	
GFR	1,200	12.0	New Zealand	200	21.0
Czechoslovakia	950	6.0	Ireland	183	
Yugoslavia	950	4.5	Dominican Rep.	172	
Italy	720	12.0	Cuba	123	
Argentina	710	22.5	Guatemala	113	
Greece	700	8.0	India	108	
Bulgaria	711	10.0	Sweden	93	15.0
Arabia	595		Syria	74	
GDR	582	10.0	Belgium	59	6.5
Hungary	550	10.0	Israel	44	
Mexico	500		Finland	20	

a considerable importer of honey; from I to XI 1972 Japan imported 9.9 tons (1).

The average world yield of wax from the bee-hive fluctuates in the region of 0.1—1.0 kg yearly (3). The USA and the Common Market Countries are the main importers of this product. Exporters are African countries, China and the Argentina. The Czechoslovakia imports about 30 tons of wax yearly and the import reaches about 10% of the country production. From among other countries France imports about 60, Belgium about 50, Holland about 370, German Federal Republic about 870 and Italy about 20 tons yearly (3).

The bee-keeping economy has a great future, but it is unknown if it will resist the progressing chemicalization of agriculture and air pollution

Table 3. The production of honey in thousands of tons (1, 4, 9)

Country	1955/59	1960/64	1965	1966	1968	1972
	average					
Total of 18 countries	331.7	383.4	392.4	384.1		
USA	109.7	114.7	110.8	111.9		
USSR	104.4	105.9	92.6	100.8		
Mexico	18.9	27.0	30.0	34.0		
Argentina	9.7	21.5	35.0	20.0		
Canada	12.7	16.0	22.3	20.0		22.7
Australia	16.8	18.4	19.1	18.1		
Spain	7.4	9.2	10.5	10.5		
Poland	10.0	10.9	11.6	12.0		
GFR	7.9	11.7	11.0	9.8		
Brazil	6.4	7.6	8.0	8.5		
Com. China	6.0	8.5	13.5	14.0	30.0	
Chile			5.6	6.0		
Japan						8.3

in industrial and strongly urbanized regions. In some countries experiments on the profitability of bee-keeping in town are carried out. The number state of bee-keeping in industrial regions may serve as a valuable index of the degree of pollution in the environment.

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STRESZCZENIE

Autor, metodą kartograficzną, przedstawił rozmieszczenie geograficzne pszczół rodzaju *Apis* L. (ryc. 1), a mianowicie czterech gatunków pszczół: 1) pszczoły miodnej *Apis mellifica* L., 2) pszczoły indyjskiej średniej *Apis indica* Fab., 3) pszczoły olbrzymiej *Apis dorsata* Fab., 4) pszczoły karłowatej *Apis florea* Fab.

Pszczoła miodna *Apis mellifica mellifica* L. na skutek różnych czynników fizyczno-geograficznych, zróżnicowania ekologicznego obszarów, wpływu działalności człowieka wytworzyła 16 podgatunków i ras geograficznych. Rozprzestrzenienie ich jest przedstawione na ryc. 2. Na obszarach Europy rozprzestrzenione są głównie cztery podgatunki pszczoły miodnej: a) pszczoła miodna właściwa — *A. m. mellifica* L., b) pszczoła włoska — *A. m. ligustica* Spin., c) pszczoła kraińska — *A. m. carnica* Pollm., d) pszczoła stepowa — *A. m. acervorum* Scor. W Europie *A. m. mellifica* L. tworzy dwa typy: północny i południowoeuropejski. Granica ich zasięgu przebiega wzdłuż 51° szerokości geograficznej północnej, dalej na zachód występuje pszczoła środkowoeuropejska. Do USA pszczołę miodną wywieziono w r. 1859, a do Australii w r. 1862.

Pszczoła indyjska — *Apis indica* Fab., zwana średnią indyjską, rozprzestrzeniona jest w Indiach, Indochinach, na wyspach Archipelagu Malajskiego, w Korei, Mandżurii, Chinach, Japonii oraz w ZSRR na Dalekim Wschodzie, w Przymorskim Kraju i często w Chabarowskim Kraju (ryc. 1). Charakterystyczną cechą tej pszczoły jest różniący się od pszczoły miodnej zasklep czerwiu. Mianowicie, wieczka komórek (trutowych) z czerwiem posiadają na środku otwór (ryc. 4 p. 11).

Pszczoła olbrzymia — *Apis dorsata* F a b. jest największa ze wszystkich pszczół (ryc. 4 p. 1, 2) i występuje w Indiach, Indochinach i Wyspach Sundajskich (ryc. 1).

Pszczoła karłowata — *Apis florea* F a b. obejmuje zasięgiem te same obszary co pszczoła olbrzymia (ryc. 1).

Granica rozsiedlenia pszczół na północy sięga mniej więcej 64° szerokości geograficznej północnej, a na południe mniej więcej 52° szerokości geograficznej południowej (ryc. 1 i 2). Północny zasięg rozmieszczenia rodzaju *Apis* na ryc. 1 jest przedstawiony schematycznie i nie zaznacza pionowych zasięgów pszczół na obszarach górskich wobec braku dostatecznych danych.

Na podstawie niekompletnych danych statystycznych, przedstawiono liczebność rodzin pszczelich w świecie, średnią wydajność miodu z jednej rodziny (tab. 1 i 2) oraz produkcję miodu (tab. 3). Ponadto, zwrócono uwagę na eksport i import miodu i wosku w niektórych państwach. Największymi eksporterami miodu są: Argentyna, Meksyk i Chińska Republika Ludowa. Importerami miodu między innymi są: RFN, Anglia, Japonia. Światowa wydajność wosku z ula waha się w granicach 0,1—1,0 kg rocznie. Głównymi eksporterami wosku są: kraje afrykańskie, Chiny i Argentyna. Głównymi importerami wosku są: USA i kraje EWG.

OBJAŚNIENIA RYCIN I TABEL

Tab. 1. Światowe zasoby rodzin pszczelich i produkcja miodu w r. 1960 w zaokrągleniu (1, 11).

Tab. 2. Liczebność rodzin pszczelich oraz średnia wydajność miodu z jednej rodziny (4, 9, 15).

Tab. 3. Produkcja miodu w tysiącach ton (1, 4, 9).

Ryc. 1. 1 — zasięg pszczoły miodnej *A. mellifica* L.; 2 — zasięg pszczoły indyjskiej *A. indica* F a b.; 3 — zasięg pszczoły olbrzymiej *A. dorsata* F a b.; 4 — zasięg pszczoły karłowatej *A. florea* F a b.

Ryc. 2. Rozmieszczenie podgatunków i form geograficznych pszczoły miodnej — *Apis mellifica* L.; 1 — pszczoła południowa afrykańska *A. m. capensis* E s c h a l t z., 2 — pszczoła afrykańska *A. m. adansoni* L a t r., 3 — pszczoła madagaskarska *A. m. unicolor* L a t r., 4 — pszczoła egipska *A. m. fasciata* L a t r., 5 — pszczoła algierska *A. m. intermissa* B u t., 6 — pszczoła syryjska *A. m. syriaca* B u t. R e e p., 7 — pszczoła perska *A.m. meda* S c o r., 8 — pszczoła cypryjska *A. m. cypria* P o l l m., 9 — pszczoła kaukaska górska *A. m. caucasica* G r o b., 10 — pszczoła kaukaska nizinna *A. m. remipes* P a l l., 11 — pszczoła krymska *A. m. taurica* A l p., 12 — pszczoła miodna właściwa *A. m. mellifica* L., 13 — pszczoła włoska *A. m. ligustica* S p i n., 14 — pszczoła włoska skrzyżowana z cypryjską, 15 — pszczoła kraińska *A. m. carnica* P o l l m., 16 — pszczoła stepowa *A. m. acervorum* S c o r.

Ryc. 3. Pszczoła miodna *Apis mellifica* L. (8); a — matka, b — robotnica, c — truteń.

Ryc. 4. Pszczoły indyjskie: 1 — matka olbrzymiej pszczoły indyjskiej; 2 — plaster olbrzymiej pszczoły indyjskiej na gałęzi drzewa; 3, 4, 5 — matka, pszczoła robocza i truteń pszczoły średniej indyjskiej *Apis indica;* 6 — plaster *Apis indica;* 7, 8, 9 —

matka, robotnica i truteń małej indyjskiej pszczoły; 10 — zasklepiony czerw średniej indyjskiej pszczoły; 11 — zasklepiony trutniowy czerw średniej indyjskiej pszczoły z widocznymi otworkami na wieczkach (13).

РЕЗЮМЕ

В работе при помощи картографического метода придставлено размещение следующих четырех видов пчел рода *Apis* L. (рис. 1) 1) пчелы медоносной *Apis mellifica* L., 2) пчелы индийской средней *Apis indica* F a b., 3) индийской гигантской *Apis dorsata* F a b., 4) индийской карликовой *Apis florea* F a b.

Вследствие различных физико-географических факторов, экологической дифференциации территории, влияния деятельности человека, медоносная пчела *Apis mellifica mellifica* L. создала 16 географических подвидов и рас. Их распространение представлено на рис. 2. На территории Европы в основном распространены 4 подвида медоносной пчелы: a) медоносная собственная *A. m. mellifica* L., b) итальянская *A. m. ligustica* S p i n., c) краинская *A. m. carnica* P o l l m., d) степная *A. m. acervorum* S c o r. *A. m. mellifica* в Европе образует два типа — северный и южноевропейский. Границы их распространения проходят вдоль 51° северной географической широты, далее, на запад, выступает центральноевропейская пчела. Медоносная пчела была ввезена в США в 1859 г., в Австралию — в 1862.

Пчела индийская *Apis indica* F a b., называемая средней индийской, распространена в Индии, Индокитае, на островах Малайского архипелага, в Корее, Монголии, Китае, Японии, а также на Дальнем Востоке СССР в Приморском и Хабаровском краях СССР (рис. 1). Характерной чертой этой пчелы является отличающийся от пчелы медоносной печатный расплод — на крышечках печатного трутневого расплода виды отверстия (рис. 4, п. 11).

Пчела индийская гигантская *Apis dorsata* F a b., является наибольшей из всех пчел. (рис. 4, п. 1 и 2) и обитает в Индии, Индокитае и на Сундайских островах.

Карликовая пчела *Apis florea* F a b., обитает там же, где и индийская гигантская (рис. 1).

Граница обитания пчел на севере достигает приблизительно 64° северной географической широты, а на юге — около 52° южной географической широты (рис. 1 и 2). Северный предел распространения рода *Apis* на рис. 1 представлен схематически (автор не выделяет вертикальных пределов распространения пчел в горных районах ввиду отсутствия достаточных данных).

На основе неполных статистических данных представлена численность

пчелиных семей на свете, средняя производительность меда 1 семьей (табл. 1 и 2), а также продукция меда (табл. 3). Кроме того, автор приводит данные экспорта и импорта меда и воска в некоторых странах. Крупнейшими экспортерами меда являются: Аргентина, Мексика и Китайская Народная Республика. Импортерами меда являются: ФРГ, Англия, Япония. Производительность воска одним ульем в мире колеблется в границах 0,1—1,0 кг в год. Главными экспортерами вска являются африканские страны, Китай и Аргентина, а импортерами — США и страны ЕЭС.

ОБЪЯСНЕНИЯ ТАБЛИЦ И РИСУНКОВ

Табл. 1. Мировые запасы пчелиных семей и производство меда в 1960 г. в округлении (1, 11).

Табл. 2. Численность пчелиных семей и средняя производительность меда одной семьей (4, 9, 15).

Табл. 3. Производство меда в тыс. тонн (1, 4, 9).

Рис. 1. 1 — распространение медоносной пчелы *A. mellifica* L., 2 — распространение пчелы индийской средней *A. indica* Fab., 3 — распространение пчелы индийской гигантской *A. dorsata* Fab., 4 — распространение пчелы индийской карликовой *A. florea* Fab.

Рис. 2. Размещение географических форм и подвидов медоносной пчелы *Apis mellifica* L., 1 — пчела южноафриканская *A. m. capensis* Eschaltz., 2 — пчела африканская *A. m. adansoni* Latr., 3 — пчела мадагаскарская *A. m. unicolor* Latr., 4 — пчела египетская *A. m. fasciata* Latr., 5 — пчела алжирская *A. m. intermissa* But., 6 — пчела сирийская *A. m. syriaca* But. Reep., 7 — пчела персидская *A. m. meda* Scor., 8 — пчела киприотская *A. m. cypria* Pollm., 9 — пчела кавказская горная *A. m. caucasica* Gorb., 10 — пчела кавказская низинная *A. m. remipes* Pall., 11 — пчела крымская *A. m. taurica* Alp., 12 — пчела медоносная собственная *A. m. mellifica* L., 13 — итальянская пчела *A. m. ligustica* Spin., 14 — пчела итальянская, скрещенная с киприотской, 15 — пчела краинская *A. m. carnica* Pollm., 16 — пчела степная *A. m. acervorum* Scor.

Рис. 3. Пчела медоносная *Apis mellifica* L. (8): a — матка, b — рабочая пчела, c — трутень.

Рис. 4. Пчелы индийские: 1 — матка пчелы индийской гигантской; 2 — пластинка пчелы индийской гигантской на ветке дерева; 3, 4, 5 — матка, рабочая пчела и трутень пчелы индийской средней *Apis indica*; 6 — пластинка *Apis indica*; 7, 8, 9 — матка, рабочая пчела и трутень пчелы индийской карликовой, 10 — печатный расплод пчелы индийской средней, 11 — печатный расплод трутня пчелы индийской средней; на крышечках видны отверстия.