NON-TRADITIONAL FOOD SOURCES: PROBLEMS AND PROSPECTS

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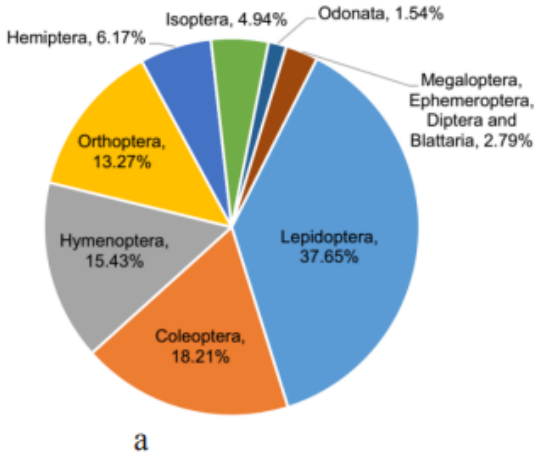
The production of food and food products from insects is noted as an alternative source of food products, especially in the fight against hunger worldwide [Chae et al., 2012; Fontaneto et al., 2011; Mariod, 2011; Premalatha et al., 2011; FAO, 2012]. In some major geographical areas, including many countries in Asia, Africa, Central America, and South America, humans breed seasonally, and many species of insects rich in protein are consumed as a daily necessity [Katayama et al., 2008]. Insects are of great interest not only as a biological resource with unlimited reproduction possibilities, but also as a new, unusual food that gives countries located in the Western regions a unique taste and taste [Bukkens, 2005; Nonaka, 2009]. Numerous scientific articles and research findings demonstrating the potential use of insects as food products as a promising non-traditional source of famine relief worldwide are widely published, primarily by scientists from European countries [De Foliart, 1992; Ramos-Elorduy et al., 2011]. According to scientific and statistical data published almost 20 years ago, over 1,500 species of insects are eaten by people belonging to over 300 ethnic groups in 113 countries around the world, regardless of their economic, social, and food capabilities [MacEvilly, 2000]. The purpose of the study is to demonstrate that even in the most developed European countries, forage insects are bred on a massive, industrial basis for various purposes, and to demonstrate the potential of these forage insects in overcoming existing problems in providing food products in agriculture, including poultry and fish farming.

Some industrial insect species in Uzbekistan and European countries [Comby, 1990]

№	**Insect species**	**State**	**Area of application**	**Sources**
1	Bombyx mori (Linnaeus, 1758)	Uzbekistan Europe	It is widely used in the silk industry worldwide	
2	Galleria mellonella*	Uzbekistan	The entomophage is mainly widely used in insect breeding, including the wax moth caterpillars used to breed the bracon (Bracon hebetor Say).	[Sulaymonov et al, 2017]
		Europe	Entomophages are widely used as objects in insect reproduction, as well as in the synthesis of melanin and various antibiotics. It is also widely used as a test module for studying the effects of various chemical and biological drugs and antibiotics	[Giannouli et al. 2014]
3	Apis mellifera*	Uzbekistan Europe	Europe is widely used in the beekeeping industry worldwide.	
4	Tenebrio molitor*	Europe *	In European countries, as well as in Asian, African, and American countries, it is	[Mlček et al, 2018],
5	Hermetia illucens*	Uzbekistan		

6	Musca domestica*		used in animal husbandry, fish farming, and poultry farming as a feed additive, as a feed additive, and as a delicacy. It is also widely used in the production of biodiesel and in the production of biological preparations against various types of insect pests. * It is primarily used as a feed additive in the experimental fishery and poultry industry.	[Soares Araújoa et al. 2019], [Khujamshukurov et al, 2016 a,b]
7	Zophobas atratus**			
8	Gryllus assimillis**			
9	Acheta domesticus*			
10	Gryllus assimillis**			
11	Locusta migratoria*			
12	Schistocerca gregaria (Forskal, 1775)			
Izoh: *–Linnaeus, 1758. **–Fabricius, 1775.				

The species Tenebrio molitor, Hermetia illucens, Musca domestica, Zophobas atratus, and Acheta domesticus, recorded in scientific sources as forage insects, are not very demanding of the nutrient medium, and the possibility of year-round breeding in controlled insectaria is of great importance in the organization of industrial production. In China alone, insect species belonging to 11 orders and 324 species are recorded as sources of food and food products



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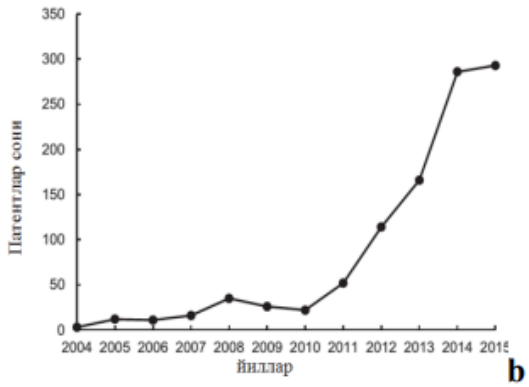

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Number of patents for insect species and forage insects registered as feed and food source in China [Ying Feng et al, 2017]

In Mexico, the following terrestrial and aquatic insect species are widely used for food production:

Insect species	Stages of development	Protein retention, %
Coleoptera	beetle and larva	23 – 66
Lepidoptera	pupa and larva	14 – 68
Hemiptera	beetle and larva	42 - 74
Homoptera	beetle, larva, and egg	45 -57
Hymenoptera	beetle, pupa, larva, and egg	13 – 77
Odonata	beetles and young beetles	46 – 65

Orthoptera	beetles and nymphs	23 – 65

Therefore, these insect species are bred and studied at the Tashkent Institute of Chemical Technology (Uzbekistan) and the "Biotechnology" Research Laboratory as a source of feed additives for poultry and fish farming. However, in local conditions, there is a need to create a special infrastructure for the production and implementation of feed additives and feed additives from forage insect species, including their production, processing, storage, distribution of finished products, and market marketing. It is also necessary to develop regulatory and legal norms required for their use as feed additives and additives.

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