

- 3) OpenMP;
- 4) C++11 Threads (similar to Boost);
- 5) Using Pthreads directly.

Considering that the developed algorithms and methods of parallel computing of the task of modeling the non-isothermal heat and moisture transfer of contaminants in soil are implemented in the SPS (Simulation Processes in Soil) software package which is based on C++ there is no need to use Intel TBB and Intel Cilk Plus technologies. Using Pthreads directly we can probably get some better results, but implementation of this software technology will take much more time than the worth of the result. Thus, we should compare OpenMP and C++11 Threads implementation. OpenMP framework has been already implemented by the authors unlike C++11 Threads. It is also interesting to use C++11 Threads because it is included in the current C++ language standard ISO / IEC 14882: 2011.

To compare OpenMP and C++11 Threads frameworks an experiment was conducted. The simulation of non-isothermal heat and moisture transfer of contaminants in soil, at a distance of 10 meters from the source was made. The speed of calculations was measured with the use of *time* function (Table 1).

Table 1. – The results of calculation time comparison of compare OpenMP and C++11 Threads frameworks

OpenMP	C++11 Threads
real 0 m 7.438 s	real 0 m 8.588 s
user 0 m 3.828 s	user 0 m 4.616 s
sys 0 m 3.132 s	sys 0 m 4.176 s

In this article we had a closer look at possible frameworks for managing multi-threading of simulation of non-isothermal heat and moisture transfer of contaminants in soil efficiently. We have seen that there are actually a variety of options, but OpenMP shows the best efficiency.

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**THE FIRST DATA ON SPECIES ANTHOPHILOUS INSECTS
VISITING INFLORESCENCES OF ARUNCUS VULGARIS
RAFIN. IN MINSK REGION (HYMENOPTERA, APOIDEA)**

The study of the relationship between anthophilous insects and plants which they pollinate is becoming increasingly important. The obtained data allow us to estimate the role of insects in seed reproduction of plants and may indicate the role of plants as sources of nectar and pollen for anthophilous insects.

Aruncus vulgaris Rafin was selected as the object of research. This plant is dioecious herbaceous perennial plant from family Rosaceae with erect stem up to 2 m. The flowers are small, white and cream colored, collected in the sprawling panicle up to 50 cm long. It spread mainly in the mountains of Central and Southern Europe, number of species locations decreases on the European plains. It blooms from mid-June to early August. The plant is perspective for introduction into the culture as an ornamental, medicinal and honey plant. Species included in the Red Book of the Republic of Belarus.

The collecting of insects was carried out during flowering period of plants in June, 2016. Insects were caught in the vicinity of the reservoir "Drozdy", Minsk. Insects caught manually directly from the inflorescence of the plant. Then they were placed in plastic test tubes with an aqueous ethanol solution. The taxonomic identification has been done with the key.

As a result of research, 11 species of Hymenoptera have been registered on inflorescences of *Aruncus vulgaris*. *Andrena hattorfiana* Fabricius have been marked. This species belongs to family Andrenidae and it was registered on the inflorescences of *Knautia arvensis*, chicory (*Cichorium*), occasionally on flowers of Labiatae, Compositae, etc. Also from that family *Andrena humilis* Imhoff was marked (prefer plants of Compositae). Family Anthophoridae is represented by males of the species *Anthophora* sp., and also females of the species *Nomada emarginata* F. Mor. Unidentified species of genres *Halictus* sp. and *Lasioglossum* sp. belong to family Halictidae. These species are polytrophic insects, pollinators of cultural and other household important plants. Family Melittidae represented by the species *Dasypoda plumipes* Panzer., which can be found almost exclusively on Asteraceae, and *Melitta tricincta* Kirby. Family Megachilidae is submitted kleptoparasite species *Coelioxys inermis* Kirby.

Thus, 11 species of anthophilous insects were registered as pollinators of *Aruncus vulgaris* for the first time. In the future we plan expand the study of taxonomic and ecological features of communities of insect which pollinate *Aruncus vulgaris*.

Shish A., Boyarkin O.

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INFLUENCE OF SOLAR ACTIVITY ON BETA-DECAY RATE

In this note we analyze the recent experiments on detecting the decrease of the decay rate of some beta radioactive elements. For the first time such data were obtained at Purdue University. Professor Jenkins, monitoring a detector in his lab (1 μ Ci sample of Mn-54), discovered that the decay rate of Mn-54 decreased slightly beginning 39 hours before a large solar flare of 2006 Dec.13. Since then, other researchers have been examining similar variation in the decay rates. For example, decreasing the decay rates were detected for the samples Cl-36 and Si-32 at the