

PROBLEMATIC SPECIES DANGER FOR URBAN SETTLEMENT STRUCTURES

RYLNIKOV VALENTIN A., Doctor of Biology

Nonstate private scientific and educational institution «Institute of Pest Management», Russia, Moscow, 117342, post box 36, e-mail: rylnikov@list.ru

Resume

Hazard assessment of pests (rodents, arthropods: flying and crawling, hereinafter pests), including at the enterprises for food production, in connection with geographical location, season of the calendar year, sanitary conditions, quality pest control, the qualifications of the operator was suggested

Key words: pests, pest-danger, pest-risk

Estimation the probability of appearance of animal pests (rodents, arthropods: flying and crawling) in the most socially and economically important (pest-danger) enterprises, allows to develop the most correct program for the pest-control, including the whole complex of preventive and extermination measures

The forecast appearance of animal pests at the object consists of the following factors

1) determining the probability of its liberation from animal pests:

- evaluation of the components of natural and forced death,
- assessment of operator's professional skill;

2) determining the estimation of the probability of repopulation the object:

- components of reproduction and immigration ,
- assessment of environmental carrying capacity, which determines the number of animal pests.

An attempt to solve this problem was made by us earlier by the example of the brown rat (*Rattus norvegicus* Berk.) using the experimental data [1, 2, 3]. However, obtaining experimental data is labor-intensive process and suitable for receiving new scientific information. In order to solve practical problems the method of expert estimation based on data collected by visual and statistical data processing is used.

Testing to evaluate the probability of settling the objects by animal pests is the author's original development. Six tests contain more than 160 questions, implemented with the help of on-line system iSpring Suite 8 IT-constructor. The answers to each of these questions is evaluated by the grade scale (0-4). Getting score evaluations is the most difficult for the operator, however, prevents empirical, speculative estimates, reducing the value of expertise. Link to dialogue is located on the Internet site: www.ipm.moscow/пест-контроль/оценка-пест-риска.

For each of the three groups of animal pests to pass a series of tests with the calculation of the final value of pest-risk is offered. For the cumulative value of pest-risk from the activities of all animal pests groups together the arithmetic mean is calculated.

Results and discussion

Evaluation of pest-danger by users is suggested to carry out in stages (Fig. 1).

The test allows a comprehensive assessment of the impact of various factors on the possibility of animal pests appearance at the object

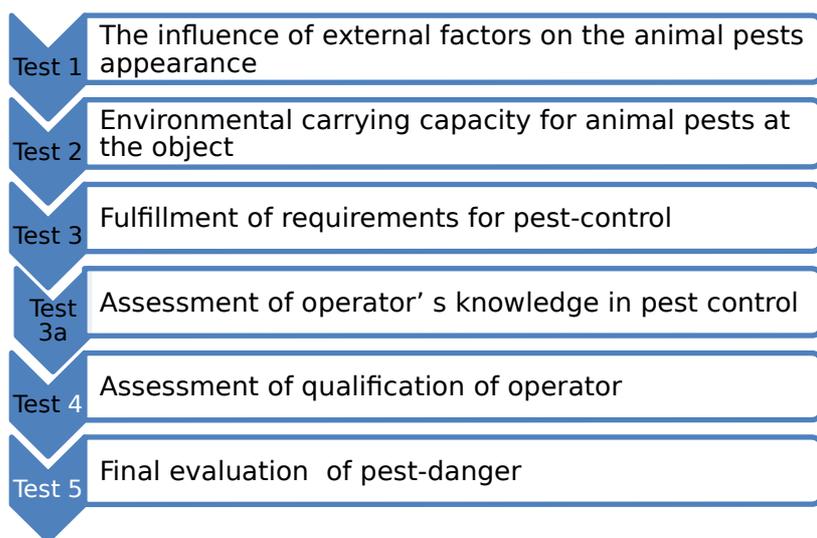


Fig. 1. Procedure of testing for pest-risk assessment

Let's dwell in more detail on each of them.

Test 1. The influence of external factors on the animal pests appearance

The following factors are independent of the actions of economic entities:

- 1) geographical location of the enterprise: the efforts aimed at animal pests extermination will be increased from the North to the South;
- 2) season: increasing of animal pests abundance by breeding takes place mainly in spring and summer, and their immigration into the buildings - in the autumn; the largest natural mortality is observed in the winter months, the lowest - in the spring and summer;;
- 3) the attractiveness of the object for animal pests depends on:
 - activities provided at the object: industrial, food and utilities, children's and medical, industrial non-food and transport enterprises, other;
 - the number of pest animals in territories adjacent to the controlled object.

Test 2. Environmental carrying capacity for animal pests at the object

Habitat carrying capacity for animal pests is determined by sanitary and technical condition of the building, the presence of possible refuge, breeding sites as a permanent (cavities in the floor,

walls, above ceiling, supporting supports) and temporal (furniture, empty boxes, garbage, products, raw materials).

The capacity of the habitat is evaluated by numerical score the discrepancy of object hygienic and sanitary requirements. The more of these shortcomings, the higher the capacity habitat.

Test 3. Assessment of fulfillment of pest-control requirement

Pest control system includes the actions aimed at extermination or repelling animal pests. The basis of this system is the points of Pest Control (PPC) with means and devices for rodents' detection and extermination placing on the floor along the walls inside buildings, on the outer perimeter of buildings and the premises along the guide movement of animal pests. There are strict requirements for the quality of PPC that must be met. All these devices should be put in the places most likely to appear pests, in this case the results of accounting and control will become the most informative. Information about PPC visiting by animal pests is subject to mandatory documentation and subsequent analysis. Any deviations from the requirements to means, technologies and documents for pest-control lead to a deterioration of indicators of the services provided quality.

Test 3a. Assessment of operator's knowledge in pest control

Without knowledge of the theoretical foundations of pest control to build a harmonious management system of the target species, and therefore to provide services of good quality is not possible. This step helps not only to evaluate the existing knowledge of the operator, but also to identify gaps and to define the ways of further professional development.

Test 4. Assessment of qualification of operator

Using the tests 3 and 4 the operator qualification is estimated.

Highly qualified operator is the pledge of effective work of the whole pest control service.

Higher index - the lower risk of pest – danger at the served objects. Insufficient qualifications, on the contrary, is a contributing factor for the emergence of pest animals at the object.

Test 5. Evaluation of the final probability of the object occupation by animal pests (pest-danger) separately for groups (rodents, arthropods flying, crawling arthropods)

The final pest-danger is determined by three main factors described earlier:

- 1) the objective factors facilitating the objects occupation by animal pests, not depending on efforts of customers and the pest-control executors ;
- 2) the factors determining the habitat capacity for the animal pests habitat depending on the efforts of customers, but do not depend on the efforts of the pest-control executors;

3) the factors determining the quality of the work of the pest-control executors in order to fulfill the pest-control requirements (Fig. 2).

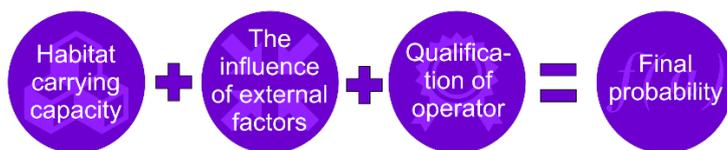


Fig 2. The final pest-danger is determined by three main factors described earlier.

The final pest danger assessment for each of the aforementioned groups of animals pests is calculated separately for each shop, their arithmetic mean for the average pest-danger value of the technological operation is calculated in rows and for medium-sized pest dangerous of pest groups - in column, then obtained data put in the table cells (table 1).

Table 1.

The value of pest-risk from animal pests activity in the technological operations in food industry (in scores).

Technological operations	No (shop name)	The f pests and pest-danger value from their presence in the operation			The average combined value of pest-risk from the activities of all animal pests groups (by rows)
		Rodents	Crawling arthropods	Flying arthropods	
Procurement and receipt of raw materials	1				
Storage of raw materials	2				
Production stage	3				
Acceptance of packaging	4				
Pre-packing	5				
Packaging and labeling	6				
Acceptance of finished products	7				
Storage of finished products	8				
Transportation of finished	9				

products					
The arithmetic mean value (Columns)	-				

Calculation of pest-risk

In order to assess the pest-risk in addition to the final pest-danger assessment it's required to evaluate the damage from their harmful activity. When assessing the damage it has to be taken into account that the patterns determining the dynamics of this index will be strictly species-specific and depended on a variety of biotic and abiotic factors. Methods of calculating the amount of damages is developed for the animals- pests of stocks: food, forage, raw materials and finished products made from it, as well as leather, fur, wool, wood, etc.; for animal pests of agricultural plants. The calculation of the damage from the activities of household pests: rodents, flies, cockroaches, fleas, etc. is developed insufficiently for successful practical assessment.

Conclusion

System of pest-danger dermination is based on dialogue: questions and answers, where the possibility to obtain the result as in each of the six tests, and in their totality is implemented. The result obtained by passing the previous tests, is used in subsequent tests.

Any practicing pest control officer can without using the methods of mathematical analysis evaluate the probability of animal pests occurrence at served objects, as well as evaluate the quality of services provided. The proposed evaluation system will help novice professionals to learn how to gather information about the object and to identify gaps in knowledge on organization of pest control system. Having the information indicated in the questions of testing system a specialist can ask experts and receive advice on feedback means.

References

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