

The effect of fipronil on some reproduction parameters of zebrafish (*Danio rerio*)

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Abstract. Our research investigated the effects of fipronil on the reproduction dynamics and parameters of the zebrafish (*Danio rerio*). The experiment consisted in exposing ready to spawn fish and the spawn itself to three different concentrations of the test substance. The survival rate over the 21 days of exposure was 100% in both the three experimental groups and control group. However, the effects on reproductive parameters were evident even at the lowest concentration of fipronil applied while exposure to the highest dose of fipronil decreased the spawn obtained considerably and as well the fecundation and hatching percentages, compared to the control group.

Key Words: fipronil pesticide, zebrafish, reproduction, spawn viability.

Summary. Beside other numerous types of persistent chemicals (Sandor et al 2012; Păunescu et al 2011; Georgescu et al 2011), pesticides are used in agriculture and public health for controlling diseases, weeds and pests (FAO, Bretveld et al 2006). Pesticides can also have negative effects on both human and animal health, phenomenon that in the initial phase are unpredictable. A distinct category of these substances can interfere with the biosynthesis or action of endogenous hormones (in humans and animals alike; Mohammad et al 2012) and are represented by "endocrine disruptors" with implications proven in the reproduction process (B. Georgescu et al 2005, 2006, 2009; C. Georgescu et al 2006).

Fipronil is an insecticide/acaricide which is used currently for removing pests, being also a second generation „phenylpyrazole based insecticide" used largely in both veterinary medicine and agricultural crops treatment (Leghait et al 2009).

The main tests were made on bioindicator species such as mice (Ohi et al 2004), but there is relevant data upon its effects on birds, lizards, fish, crawfish, shrimps and bees (US EPA 1994, 1996, 1997; Avault 2001; Peveling & Demba 2003).

Table 1

Results of reproduction parameters in zebrafish

Specification	Average spawn/day	Highest spawn/day	Total spawn/21 days	Fecundation %	Hatching %
LM	170	711	3585	76.5	90
C1	149	899	3134	71	84
C2	141	633	2962	67	61.5
C3	135	622	2851	62	35

Our research followed the effects of fipronil upon the reproduction dynamics and parameters of the zebrafish (*Danio rerio*). The experiment (Fig. 1) consisted in exposing ready to spawn fish and the spawn itself to three different concentrations of the test substance (the „Regesc” insecticide which contains 100g/L fipronil). Thus, the survival percent of ready to spawn fish, the daily spawn production, the fecundation percent and hatching percent were registered for evidences and comparisons.



Figure 1. Monitoring the reproductive activity of zebrafish correlated to the concentration of the test substance.

In determining the three concentrations of fipronil (C1=0.016mg/L, C2=0.041 mg/L, C3=0.082 mg/L) knowledge about the LC₅₀ for the guppy fish (*Poecilia reticulata*) (0.165 mg/L) played a crucial role.

The survival rate over the 21 days of exposure was 100% in both the three experimental groups (C1-C3) and control group (LM). However, the effects on reproductive parameters were evident even at the lowest concentration of fipronil applied while exposure to the highest dose of fipronil decreased the spawn obtained considerably and as well the fecundation and hatching percentages, compared to the control group (see data in Table 1).

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