# THE EFFECTS OF SOME FODDER ADDITIVES ON GROWTH PERFORMANCE OF SIBERIAN STURGEON (*ACIPENSER BAERI*)

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**Abstract:** The effects of fodder additives Actigen, Sel-Plex and Yea-Sacc-1026 on growth performance of juvenile Siberian sturgeon were investigated in this experiment. The experiment was carried on 108 sturgeon divided in four groups consisting of 27individuals each. The first group was fed with 0.08% Actigen added to daily feed, the second group had 0.03% Sel-Plex added to daily feed, the third group had 0.2% Yea-Sacc added to daily feed and the forth group (control) was fed regular feed with no additives. The experiment was carried out over a period of 18 weeks from the 1st of July to the 2nd of November 2016. Over the course of the experiment the following performance indices were monitored: specific growth rate, body mass, total biomass, food conversion ratio and survival rate. At the end of the experiment a 8.93% growth in body mass was observed in group 3 (Yea-Sacc 0.2%) compared with the control group. Total biomass recorded an 8.78% growth in group 3 (Yea-Sacc 0.2%) compared with the control group. The growth rate of group 3 (Yea-Sacc 0.2%) was 30.05% higher than the control group. The effects of the additives on survival rate were positive, no loss was recorded.

**Keywords:** Siberian sturgeon (Acipenser baeri), Actigen, Sel-Plex, Yea-Sacc-1026, growth performance.

## INTRODUCTION

Prebiotics are organic or inorganic substances that promote the development of beneficial microorganisms in the digestive tract. As an alternative to using antibiotics, in aquaculture, pre- and probiotics are used more frequently in fish feeds for their positive effects on growth performance and general health. In a series of tests, the first dating from 2011 (Hung and col.), the effects of the prebiotic Actigen on the survival rate of pangasius artificially infected with the *Edwardsiella ictaluri* bacteria were evaluated. Based on the observations made a grater immunity to the bacteria was recorded witch led to the conclusion that the prebiotic Actigen had a positive effect on survival rate compared with the control group. The positive effects of adding 0.04% Actigen to the feed of Nile tilapia on growth rate were recorded by Yutharaksanukul P. 2010, cited by Ringo and col. 2010, and by increasing the dosage to 0.08% and 0.12% a better feed conversion ratio, improved immunity and reduced mortality was observed in catfish (Le Thanh Hung and col. 2010).

A new trend in aquaculture is represented by replacing animal protein sources in fish feed. One of the alternatives is represented by live yeast cell cultures like the product Yea-Sacc-1026. The concept of using this yeast in fish feed is new, but Yea-Sacc-1026 was successfully used with great results on improving growth rate in terrestrial animals. Mohsen Abdel (2010), considers that using live yeast cells as a probiotic leads to an increased resistance to bacterial infections and grater activity of digestive enzymes in the digestive tract. By adding organic selenium (Sel-Plex) to the feed of carp (*Cyprinus carpio L.*) a higher survival rate and biomass accumulation was recorded (Ani and col., 2008; Ani and col.,

2009a, 2009b; Şara and col., 2009a). By adding organic selenium (Sel-Plex) to the feed of brook trout (*Salvelinus fontinalis* M.) the growth rate and survival rate was greatly increased (Şara and col., 2009b; Şara and col., 2010a, b; Barbu and col., 2009).

The goal of this research was to find out the effect of some fodder additives (Actigen, Sel-Plex and Yea-Sacc-1026) on the growth performances of Siberian sturgeon (*Acipenser baeri*).

## MATERIAL AND METHOD

The research was conducted at ICAS Gilău trout farm, Cluj county, Romania in the period july – november, on a number of 108 fish split evenly into 3 experimental groups (Actigen 0.08%, Sel-Plex 0.03% and Yea-Sacc-1026 0.2%) and a control group. The species of interest was represented by the Siberian sturgeon (*Acipenser baeri*), the fish were approximately 10 months old. At the time of starting the experiment the biologic material had a body weight of 400 grams per individual and 50cm body length. The groups were kept under the same ambiental conditions, in identical concrete tanks (tanks of 4/1/1.3 m) with a $4m^2$ surface, each supplied with water from a reservoir at a constant flow rate of 20l/min. Water temperature ranged form 13.0°C and 17.2°C. The monitored chemical parameters of the water were: dissolved oxygen, pH, nitrites, nitrates and nitrogen ammonia.

Table 1

The monitored chemical parameters of tank water

| Specification | M.U. | Value |
|---|---|---|
| $O_2$ | mg/l | 6.4 |
| pH | pH | 7.18 |
| Sulphates | mg/l | 32 |
| $NO_2$ | mg/l | 0 |
| $NO_3$ | mg/l | 0 |
| $NH_3$ | mg/l | 0 |

The feed used was 5mm pellets made by Skretting without any additives for the control group and with added additives for the other groups as follows: group 1 had Actigen added in a ratio of 0.08%, group 2 had Sel-Plex added in a ratio of 0.03% and group 3 had Yea-Sacc-1026 added in a ratio of 0.2%. The nutrients fount in the Skretting feed are represented in table 2.

Table 2

The nutrients fount in the Skretting feed

| Specification | M.U. | Value |
|---|---|---|
| Protein | % | 41 |
| Ash | % | 7.8 |
| Fat | % | 12 |
| Cellulose | % | 2.5 |
| Phosphor | mg | 1.1 |
| Copper | mg | 6 |
| Vit. A | U.I. | 10000 |
| Vit. E | mg | 150 |
| Vit. D3 | U.I. | 1250 |

The feed was administered in two stages per day at 9AM and 6 PM. The quantity of feed administered has varied based on water temperature, biomass and fish appetite.

The surgeon were weighed individually, at the start of the experiment and at 4 week intervals. The monitored growth indices were specific growth rate, body mass, total biomass, food conversion ratio and survival rate. The experimental data was processed statistically using the T test with the Graph Pad InStat 3 program.

## RESULTS AND DISCUSSION

The mean values and variability of body mass of the Siberian sturgeon during the experimental period are represented in table 3.

Table 3

Body mass of the Siberian sturgeon

| Group | No. | Body weight (gr/piece) | | | | X±sx | V% |
|---|---|---|---|---|---|---|---|
| | | Initial | | final | | | |
| | | gr. | % | gr | % | | |
| Control | 27 | 450 | 100 | 716 | 100 | 716±22.8 | 25.17 |
| 1E (Actigen 0.08%) | 27 | 450 | 100 | 720 | 100.55 | 735±33.2 | 23.42 |
| 2E (Sel-Plex 0.03%) | 27 | 450 | 100 | 718 | 100.27 | 718±25.03 | 22.88 |
| 3E (Yea-Sacc 0.2%) | 27 | 450 | 100 | 780 | 108.93 | 780±37.7** | 16.53 |

** - P<0.01;

Analysis of the sturgeon body weight reveals an improvement of 8.93% in the case of group 3 (Yea-Sacc 0.2%) compared to the control group, this result is comparable to the one Mohsen Abdel-Tawwab obtained in 2012 in witch he observed an improvement in body weight of 15.85% in Nile tilapia. Experimental groups 1 and 2 (Actigen 0.08% and Sel-Plex 0.03%) show values approximately the same concerning body weight compared to the control group. The control group, as well as groups 1 and 2(Actigen 0.08% and Sel-Plex 0.3%) show a great (20%<v%<30%) degree of variability of body mass , v% > 22.88%, while experimental group 3 (Yea-Sacc0.2%) shows a smaller variability of v% = 16.53 (10%<v%<20%).

The effects of the fodder additives administered in the fish feed (Actigen 0.08%, Sel-Plex 0.03% and Yea-Sacc 0.2%) of the 4 groups are represented in table 4.

Table 4

Growth performance values registered on Siberian sturgeon at the end of the experiment

| Specification | M.U. | Control | 1E (Actigen 0.08%) | 2E (Sel-Plex 0.03%) | 3E (Yea-Sacc 0.2%) |
|---|---|---|---|---|---|
| Growth rate | gr | 259 | 261 | 276 | 338 |
| | % | 100 | 100.77 | 106.56 | 130.50 |
| Specific growth rate | gr/day | 2.05 | 2.07 | 2.19 | 2.68 |
| | % | 100 | 100.97 | 106.82 | 130.73 |
| Final biomass | kg | 19.35 | 19.45 | 19.40 | 21.05 |
| | % | 100 | 100.51 | 100.25 | 108.78 |
| FCR | | 1.49:1 | 1.48:1 | 1.40:1 | 1.14:1 |

Analyzing the most important growth performance indices over the entire experimental period a favorable trend appears as a result of adding fodder additives in varying doses 0.08% Actigen, 0.03% Sel-Plex and 0.2% Yea-Sacc-1026 to the fishes diet. We can clearly see an improvement in growth rate, of 30.5% in the case of experimental group 3 (Yea-Sacc 0.2%) compared to the control group, also the specific growth rate registered a growth of 30.73% in the same group compared to the control group. The final biomass is also registering a 8.78% growth in experimental group 3 (Yea-Sacc 0.2%) compared to the control group. The other groups, 1 and 2 (Actigen 0.08% and Sel-Plex 0.03%) are not presenting significant differences compared to the control group.

There are no significant differences in the food conversion ratios in groups 1 and 2 compared to the control group. In experimental group 3 (Yea-Sacc 0.2%) the food conversion ratio was notable lower (1.14:1) than that of the control group.

Concerning the survival rate, there were no losses registered during the experimental period.

## CONCLUSIONS

- The use of fodder additives (Actigen 0.08%, Sel-Plex 0.03%, and Yea-Sacc-1026 0.2%) in the diet of Siberian sturgeon has determined an improvement of the growth indices.
- The addition of Yea-Sacc-1026 in a 0.2% ratio has determined a growth of the body mass of 8.39% in group 3 compared to the control group.
- The growth rate of group 3 (Yea-Sacc 0.2%) has increased significantly (30.05%) compared to the control group
- Final biomass has also increased by 8.78% in group 3 compared to the control group
- In experimental group 3 (Yea-Sacc 0.2%) the food conversion ratio was notable lower (1.14:1) than that of the control group.
- Having registered no losses during the experimental period in any of the groups (Actigen 0.08%, Sel-Plex 0.03%, and Yea-Sacc-1026 0.2%) we can conclude that the addition of fodder additives into the feed had a positive effect on the survival rate.

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