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CHARACTERIZATION OF UNIT PRODUCING FINGERLINGS OF RIO GRANDE OF SOUTH, BRAZIL

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ABSTRACT

The production of fingerlings is an important link in the production chain of fish farming in the state of RS, generating income and employment. The aim of this study was to characterize the units producing fingerlings state of Rio Grande of South (RS). To both, was drafted a questionnaire consisting of open-ended questions and close-ended. Sixteen out of eighteen hatcheries answered the form between September 2011 and February 2012. The analysis shows that silver catfish fingerlings (*Rhamdia sp.*) and grass carp (*Ctenophynigodon idella*) are the most produced by hatcheries visited. It was observed that there is no control of the quality and origin of animals are used as breeding stock. Therefore, it is suggested to carry out a breeding program for the development of improved strains for increased productivity of the species that are used in fish farming in the state. These observations reinforce the need of joint efforts among research, extension and government, in order to contribute to the improvement of this productive sector of the state of RS. However, the application of new production technologies and management that seek to reduce the costs of production must take into account the local reality of hatcheries.

INTRODUCTION

The state of Rio Grande of South stands out in Brazilian as the largest producer of freshwater fish culture in the triennium (2008 a 2010), producing about 55,066 tonnes of fish in 2010 (MPA, 2012). Despite this favorable scenario, the Rio Grande of South state has no consistent accompaniment of the production of fish as availability, demand, cultivation conditions, number and origin of breeding of the main species of fish produced in the state. Important information to plan strategizes, to diagnose possible problems and find solutions for the sector. In this context, Scorvo-Filho *et al*. (2010) warn of lack of updated data on the fry producers laboratories in Brazil. Therefore, the lack of information observed in the RS also applies on the national scene. Given the growth in fish production of Rio Grande of South state and the lack of information on Fingerlings Production Units (UPAs – Unidades Produtoras de Alevinos) of the state, the objective of this study was to characterize them, as the geographical distribution, production numbers, facilities, health and production technology and management used.

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MATERIALS AND METHODS

From the review of national and international journals on good management practices recommended for units producing fingerlings, we designed a questionnaire with 106 open and closed questions. The questionnaire was subdivided in questions relating to the technical characteristics of the production units of fry (location, area of the local, number of employees, work experience as a producer of fingerlings, etc.), technical assistance to producers, nurseries conditions, origin and destination the water used in farming, health of fry and breeding, breeding stock, conditions and management practices used in breeding laboratories, production of larvae and production of fry and number of fry produced in the 2010/2011 season.

The questionnaire was conducted with sixteen of the eighteen fry producer units in the state of Rio Grande of South

registered as assets at the Enterprise Technical Assistance and Rural Extension (EMATER-RS) between the months of September 2011 and February 2012, the other two did not respond. Data were registered on an Excel spreadsheet and subjected to descriptive statistics (mean ± standard deviation), where necessary.

RESULTS AND DISCUSSION

In the survey of the number of UPs (Table 1) and its distribution (Figure 1) by the state of Rio Grande of South, was identified that 50% of enterprises are located in the Northwest region, 31.25% in the central region and 18.17% in east region. A favorable factor for UPAs installation in the northwest region is the favorable meteorological conditions for the development of pisciculture, compared with other regions, as in the northwest occur the highest average rainfall of the state (1500 - 1800 mm of rain/year) and average annual temperatures (16-20°C) (Kuinchtner and Buriol, 2001).

Table 1. Municipalities of Rio Grande of South state that have production units of frilergs – UPAs (Production 2010/2011)

Municipalities	Number of UPAs/Municipalities
Ajuricaba	1
Cruzeiro do Sul	1
Ijuí	1
Frederico Westphalen	1
Mato Leitão	1
Passo do Sobrado	1
Passo Fundo	1
Pejussara	1
Seberi	1
Sentinela do Sul	1
Silveira Martins	1
Tapejara	1
Teutônia	1
Terra de Arreia	1
Três de Maio	1
São João do Polêsine	1
Viamão	1
Victor Graeff	1
Total	18

Source: Research data (2010/2011)

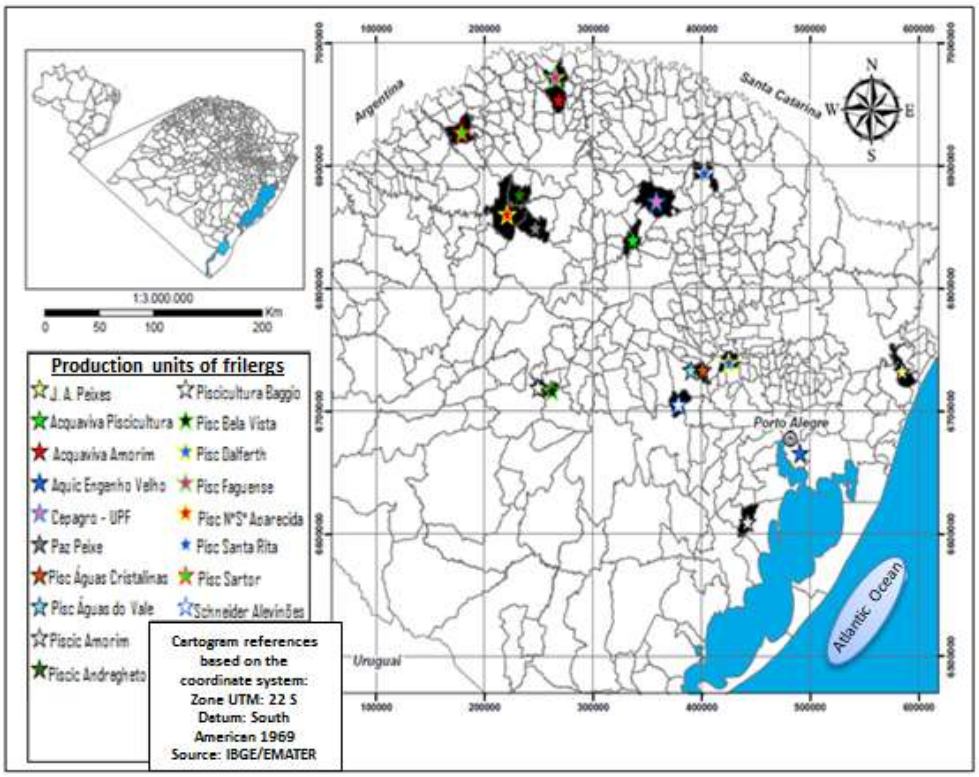

Figure 1 .Geographical distribution of production units of frilergs (UPAs) of Rio Grande of South state, production 2010/2011

The absence of UPAs in the west and south region of the Rio Grande do South state, is related to the strong tradition of beef cattle in rural areas of these regions (Seplag, 2006). In those regions the pisciculture is carried out in the way home-grown, as a complementary activity in the property and own consumption, no economic importance in employment generating and income (Piedras and Bager, 2007).

The analysis of installations indicators (Table 2) showed that there is great variation in the total area of the properties (ha). The same is observed for total area of water surface available for the production of fry which is a direct consequence of the production capacity of the UPAs.

The Rio Grande of South state had 50 hectares of water surface in total for the production of fingerlings (Poli *et al*., 2000). However, in this study it was found that the total area destined to nursery in the period 2010/2011 increased by 2.8 times compared to 2000, reaching 140.4 hectares. This situation is consistent with the continued growth of production (kg) of the pisciculture of state from the year 2007 (MPA, 2012).

Regarding the total number of nurseries were recorded 497 (Table 2), 85.3% used for nursery and 14.7% used in the storage breeding.

Table 2. Indicators of instalations and equipment of the UPAs of Rio Grande of South, production 2010/2011

Indicators of instalations and equipment	Total	Mean	Standard deviation (SD±)
Property area (ha)	839	69.9	92.4
Water surface (ha)	140.4	11.7	13.0
Number of employees	39	4.33	4.0
Percentage of UPAs with quarantine (%)	25	-	-
Percentage of UPAs with monk in nurseries (%)	25	-	-
Percentage of UPAs using aerators (%)	25	-	-
Number of nurseries used to nursery (un)	424	35.33	26.8
Area of nursery used for nurseries (m²)	1 086.4	1 016.6	686.0
Number of nurseries used for storage (un)	73	6.08	2.39
Area of nurseries used for storage breeding animals(m²)	351 577.0	2 016.6	1 068.4
Depth nurseries of UPAs (m)	-	1.49	0.34
Area of reproductive laboratory and larval rearing (m²)	-	108	105
Number of induction and reproduction tanks	-	4	2
Volume of induction and reproduction tanks (m³)	-	2125	801
Number of type incubators Woynarovich of 60 litros	101	16.8	5.2
Number of type incubators Woynarovich of 200 litros	87	9.6	4.5
Number of glass type incubators McDonald of 9 litros	60	-	-
Percentage of UPAs with stereoscopic microscope (%)	75	-	-
Percentage of UPAs with transport carton for live fish (%)	100	-	-

Table 3. Species produced, estimate fry units produced/species (unit), percentage of production fry/species, average price of lote (R$) and standard deviation (SD ±) of production 2010/2011 in Rio Grande of South state

Species produced	Number fry produced 2010/2011 (unit)	Total of fry produced (%)	Number UPAs produced	Average price of lote R$	Standard deviation (SD±)
Carpa Capim (*Ctenopharigodon idella*)	4 580 000	33.7	10	222,00	115.45
Carpa Cabeça Grande (*Aristichthys nobilis*)	990 000	7.3	9	188,89	85.76
Carpa Prateada (*Hypophthalmycthys molitrix*)	1 120 000	8.2	9	188,89	85.76
Carpa Húngara (*Cyprinus carpio*)	1 130 000	8.3	9	188,00	61.61
Carpa Ornamental (*Cyprinus carpio*)	220 000	1.6	6	400,00	312.66
Espécies ornamentais	140 000	1.0	4	610,00	326.98
Tilápia linhagem tailandesa (*Oreochromis niloticus*)	850 000	6.2	3	86,25	26.23
Tilápia linhagem Gift (*Oreochromis niloticus*)	650 000	47	2	123,75	28.30
Jundiá (*Rhamdia sp.*)	2 300 000	16.9	10	234,00	132.93
Traíra (*Hoplias malabaricus*)	160 000	1.18	5	425,00	274.51
Trairão (*Hoplias lacerdae*)	105 000	0.77	6	541,67	348.91
Lambari (*Astynax* sp.)	775 000	5.7	7	138,57	59.87
Pacu (*Piaractus mesopotamicus*)	330 000	2.4	5	280,00	168.08
Grumatã (*Prochilodus* sp.)	70 000	0.52	4	172,50	98.41
Piava (*Leporinus* sp.)	90 000	0.66	2	250,00	154.11
Piauçu (*Leporinus macrocephalus*)	40 000	0.29	2	215,00	109.08
Dourado (*Salminus brasiliensis*)	15 000	0.11	2	5500,00	2 559.99
Pintado (*Pseudoplatystoma* sp.)	5 000	0.04	1	6000,00	-
Total	13 570 000	100	-	-	-

With regard to hand labor used, 19% (3 UPAs) are exclusively inherited and other properties (81% of the UPAs) hire employees, with an average of 3.6 employees / hectare water surface. Hand labor in fry production is an important socioeconomic indicator, as it represents the main cost item in the production of fingerlings. (Barros, 2005). This study verified that 42% of the surveyed UPAs, using spring water without damming.

The waters from springs may contain high levels of iron (Fe 3^{+}), which when in contact with oxygen precipitates in the form of iron hydroxide - Fe $(OH)_3$, which can cover up the chorion preventing gas exchange of the embryo (Kubitza, 2004). Thus, it is recommended that water with this characteristic are subjected to a resting tanks for separating the iron hydroxide before being used for the supply of incubators. In relation to monitoring, 83% perform some sort of analysis

of physical and chemical parameters of the water used in the cultivation of nurseries, however without necessary frequency. The apparent oversight observed in UPAs consulted with the monitoring of physical and chemical parameters of water quality, was also observed by Barros *et al*. (2011) studied the characterization of the pisciculture micro-region of the Cuiabá, where 62.5% of the fish farmers perform out some kind of monitoring, but only when problem is visually diagnosed in nurseries. The incidence of diseases in period 2010/2011 reported by fish farmers interviewed was 58%, the lerneose, ictiofitiríase, fungal attack and bacterial diseases were the main diseases cited. The use of the breeding during period 2010/2011 was performed for 18 species. The total number of fish that make up the breeding herds is 27.384 animals. Excluding the *Astyanax* sp., this number is reduced to 8.804 animals. However, there was a low utilization of breeding and pattern during the period 2010/2011, as the average rate of animals used during this period (excluding the *Astyanax* sp.) was 25.78%. Similar results were found by Guerreiro (2012) in commercial pisciculture of tambaqui (*Colossoma macropomum*) in the state of Rondônia. The underutilisation of breeding animals, may have economic implications for producers, as unnecessary expenditures with food, used space and availability of water for the maintenance breeding, which in some cases will never be used.

In Rio Grande of South is common to obtain fry and breeding of fish farms of the other regions of Brazil (Baldisserotto, 2009). It was found that 83% of producers affirm to know the origin of the breeding and pattern; and 81.2% reported the acquisition of breeding and pattern out of its properties, and of this total, 62% say they get animals from other regions of the state and 38% from other states, especially of Santa Catarina, Paraná and São Paulo. However, the practice of introduction genetic material autochthonous can produce disastrous results, for example, genetic introgression (Jacometo *et al.,* 2010). In this context, it is worth emphasizing that there is no study or survey about genetic characteristics of breeding in Rio Grande of South, unknown up the fettle of homozigoses or as the crossing of the breeding are assembled. Thus, it is necessary to carry out studies for the implementation of strategies and actions.

In terms the total production of 2010/2011 (Table 3), amounted to 13.57 million fingerlings, and the average weight of fingerlings commercialized by UPAs was 9.36 grams (± 8.39), however, considering all visited PSUs, 37.5% not know how to inform the number of produced fry. This fact can be considered a failure serious management of these properties, as the total production of information and fry each marketed species are essential for the planning and management of these properties. However, this information is an important fingerlings demand indicator required by the production chain in the state and country. The production of the fingerlings of state Rio Grande of South informed for Poli *et al*. (2000), was 38 million. However, these authors affirm this estimative was because of the absence of official monitoring and / or private (associations) of an important segment of the production chain of pisciculture. This observation showed the importance of performing official statistical research, constant and specific to the productive chain of pisciculture in Rio Grande of South state and Brazil. In the same context, Scorvo-Filho *et al.* (2010), warn of absence of updated information on the number of unit producing fingerlings in Brazil. Among the species produced by UPAs, grass carp and catfish noted for representing 33.7% and 16.9% of total production, respectively (Table 3). The production of carps correspond to 59.1% of production fingerlings. These data show the importance of this group of fish to the productive chain of pisciculture from the Rio Grande of South, since according to Baldisserotto (2009), the state is the major producer of carp of country. The grass carp present highest average selling price, confirming the importance of this species for pisciculture in RS. Barros (2005), evaluating the technology and the production costs of a UPA of Mato Grosso of South state in 2003, reported that the sale of species of fingerlings were responsible for the third highest profit of the enterprise, which at the time commercialized fingerlings of nine species. The principal destination of fingerlings commercialized in the 2010/2011 season reported by respondents producers are municipal governments of the state of Rio Grande of South that distribute and provide fingerlings to producers with up to 50% subsidy. This characteristic may be related to small properties family agriculture from the center to the north of Rio Grande of South state. Other destinations are producers in the state of Santa Catarina and Rio Grande of South.

Conclusion

Starting from the scenario presented it is evident that the fingerlings production is an important link in the production chain of fish from the Rio Grande of South state, generating income and employment. However, it was found that many UPAs show in the management and fault handling. This reinforces the deployment jobs in conjunction between producers, research institutions, extension and development in order to advertise among the producers the importance of monitoring and control of physical and chemical parameters of water quality in the production of fingerlings, and develop genetic improvement programs and planning technologies and management seeking to reduce costs of production and consider the local reality of the enterprises.

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