Economic impact of fascioliasis in buffalo production

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Abstract

Economic impact of fascioliasis in production was determined in naturally infected buffaloes of both male and female. It was found that the infected buffaloes showed signs of sickness and even death in a severe case, whereas the treated animals were healthy. Average weight gain in the nitroxynil-treated group in both yearling and adult buffaloes was greater that that of the untreated group. A number of plowing hours within 1 day in the treated animals was more than that in the untreated group. Age at puberty and age at first calving in the nitroxynil-treated group was shorter than that of the untreated group. Buffaloes with previous history of infertility became fertility after treatment with nitroxynil.

Key words : Economic impact, Liver fluke, Nitroxynil, Buffalo production

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Introduction

Liver fluke is one of the most important factors which hampers in livestock production. The prevalence of liver fluke infection in lowland areas and areas with water reservoir was higher than that found in highland areas and areas without water reservoir (Sukhapesna, et al., 1989). The infection rate was found to be as high as 58.03 percent in cattle and 68.45 percent in buffaloes in certain areas of Northeast Thailand (Sukhapesna, 1980). Liver fluke is considered of economic importance in cattle and buffaloes, especially in irrigated areas or areas with natural water reservoir. Therefore, the purpose of this experiment was to study the economic impact of fascioliasis on buffalo production under certain conditions in village level of Northeast Thailand on weight gain, working capaacity and reproductive performance.

Materials and Methods

1. Study on weight gain of yearling and adult buffaloes.

Twenty naturally infected yearling and adult buffaloes with liver flukes each in an irrigated area were used in this experiment. The animals were allowed to graze in the paddy field or along the roadside during the day and housed at night. They were also allowed to drink water in the public water in the public water reservior which was available throughout the year. The animals of each age group were allotted into 2 groups of 10 each, based on body weight and worm egg counts. Treatment of the various groups was as follows :

Group 1 : Nitroxynil (34 percent) was administered subcutaneously at a dose rate of 10 milligrams per kilogram of body weight

Group 2 : Untreated control.

Nitroxynil was given to yearling and adult buffaloes in the treated groups at day 0 and 60. Fecal samples were collected directly from the rectum of each animal before treatment to determine the number of fluke eggs per gram of feces by the Beads technique (Taira, 1985). Each animal was weighed before treatment and was also weighed after treatment at the interval of 1 month for 12 consecutive periods to compare weight gain between the treated and the untreated groups.

2. Study on general condition of buffaloes infected with liver flukes.

Naturally infected calves, yearling and adult buffaloes with liver flukes in an irrigated area as described for study 1 were observed general condition, including any clinical signs which might be produced from the liver flukes. This was also observed in the infected animals after treatment with effective flukicide, nitroxynil for comparison.

3. Study on working capacity in the field.

Twenty naturally infected adult buffaloes with liver flukes in an irrigated area as described for study 1, 4 to 5 years of age were used in this experiment. The animals were allotted into 2 groups of 10 each, based on body weight and worm egg counts. Treatment of the various groups was the same as previously described in the study of weight gain on yearling and adult buffaloes. Working capacity of each animal in both treated and untreated groups was assessed by count a number of plowing hours in certain paddy field within 1 day.

4. Study on reproductive performance.

Twenty naturally infected buffalo calves and buffalo heifers with liver flukes in an irrigated area as described for study 1 each were used in this experiment. The animals in each age group were allotted into 2 groups of 10 each, based on age and worm egg counts. Treatment of the various groups was the same as previously described in the study of weight gain on yearling and adult buffaloes. All animals in the treated and the untreated groups were observed reproductive performance as puberty period and fertility. Twenty infected buffalo cows with known history of giving birth a calf before were also used in this experiment. These animals had a problem of infertility for a period of 1 to 3 years after previous parturition. The animals were allotted into 2 groups of 10 each, based on age and worm egg counts. Treatment of the various groups was the same as previously described. Each animal was observed in fertility in both 2 groups for comparison after treatment for a period of 2 to 3 year.

Results

1. Study on weight gain of yearling and adult buffaloes.

Comparison of weight gain in treated and untreated yearling buffaloes is presented in Table 1. Average weight gain of the nitroxynil-treated animals was greater than of the untreated animals every month throughout the 12 experimental periods. Before the experiment, the difference average weight of animals in both groups was 1.4 kilogram. After treatment, it was found that the average weight gain in the nitroxynil-treated group was 195.2, 245.8, 267.3 and 287.6 kilograms in the second month, fifth month, eight month and the eleventh month respectively. Whereas the average weight gain in the untreated group was 192.7, 218.4, 235.6, 257.3 kilograms, respectively in the corresponding months. The difference in average weight gain between these two groups was found as much as 35.4 kilograms in the last month of experiment. Statistical analysis revealed that the treated group was significantly different ($P<.001$) from the untreated group.

Table 1. Comparison of weight gain in treated and untreated yearling buffaloes.

Group of aninal	Average weight gain in yearling buffalo (kilogram)											
	Pretreatment	Posttreatment (Month)										
		1	2	3	4	5	6	7	8	9	10	11	12
Nitroxynil-treated group	187.5	189.4	195.2	219.3	231.6	245.8	239.5	254.7	267.3	263.8	274.1	287.6	*** 298.6
Untreated group	186.1	186.3	192.7	198.5	204.2	218.4	227.9	238.1	235.6	242.4	252.7	257.3	263.2

*** Highly significant from untreated group (P<0.001).

Table 2. Comparison of weight gain in treated and untreated adult buffalos.

Group of aninal	Average weight gain in adult buffalo (kilogram)											
	Pretreatment	Posttreatment (Month)										
		1	2	3	4	5	6	7	8	9	10	11	12
Nitroxynil-treated group	315.2	317.1	323.8	332.4	328.9	332.5	345.6	341.2	347.1	352.7	358.4	361.3	** 369.0
Untreated group	317.3	315.8	309.2	302.5	311.6	313.4	315.9	319.3	326.8	329.5	335.1	328.7	337.1

*** Highly significant from untreated group (P<0.001).

Comparison of weight gain in treated and untreated adult buffaloes is presented in Table 2. Average weight gain of the nitroxynil-treated animals was greater than that of the untreated animals every month throughout the experiment. Before treatment, the difference average weight of animals in both groups was 2.1 kilograms. At the end of the experiment, it was found that the average weight gain in the nitroxynil-treated group was 369.4 kilograms, whereas it was 337.9 kilograms in the untreated group. The difference in weight gain between these two groups was 31.5 kilograms. Statistical analysis revealed that the average weight gain in the treated group was significantly different ($P<0.001$) from the untreated group.

2. Study on general condition of buffaloes infected with liver flukes.

It was found that buffaloes infected with liver flukes were unhealthy condition. The severity of fascioliasis depends upon the degree of infection. In general the infected animals showed signs of sickness as loss of body weight, anorexia, anemia, digestive disorder with constipation or diarrhea, debility, emaciation, dullness, difficulty in movement, prostration and death in a severe case. Whereas the treated animals were healthy without showing any symptoms.

3. Study on working capacity.

Comparison of working capacity in treated and untreated buffaloes is presented in Table 3. Working capacity of the nitroxynil-treated group was greater than that of the untreated group. It was found that a number of plowing hours with-in 1 day of the treated buffaloes was 4 hours, whereas a number of plowing hours of the untreated animals was 1 to 2 hours. In general, buffalo is allowed to plow the land 4 hours in 1 day and about 90 days in 1 year. Income from plowing wage in the treated buffaloes was 80 bahts in 1 day or 7200 bahts in 90 days per year. Whereas in the untreated animals, it was only 20 to 40 bahts in 1 day or 1800 to 3600 bahts in 90 days.

4. Study on reproductive performance.

Comparison of reproductive performance in treated and untreated buffaloes is presented in Table 4. Reproductive performance of the nitroxynil-treated group was better than that of the untreated group. In the treated animals, age at puberty was 2 1/2 to 3 years in male, 3 to 3 1/2 years in female, and age at firstcalving was 4 to 4 1/2 years. Whereas in the untreated animals, age at puberty was 3 to 3 1/2 years in male, 4 1/2 to 5 years in female, and age at first calving was 5 1/2 to 6 years. It was also found that buffalo cows with a problem of infertility after previous parturition became fertility after treatment in the nitroxynil-treated group. Whereas the animals still had a problem of infertility in the untreated group.

Table 3. Comparison of working capacity in treated and untreated buffaloes.

Group of aninal	A number of plowing hours within 1 day	Income from plowing wage (Baht)	
		1 day	90 days/year
Nitroxynil-treated group	4	80	7200
Untreated group	1-2	20-40	1800-3600

Table 4. Comparison of reproductive performance in treated and untreated buffaloes.

Group of aninal	A number of plowing hours within 1 day		Age at first calving (year)	Fertility	
	Male	Female		Pretreatment	Posttreatment
Nitroxynil-treated group	2 1/2-3	3-3 1/2	4-4 1/2	Infertility	Fertility
Untreated group	3-3 1-2	4 1/2-5	5 1/2-6	Infertility	Infertility

Discussion

The data indicates that fascioliasis had a definite effect on weight gain in buffaloes. This was proven by the fact that average weight gain in the nitroxynil-treated animals was greater than that of the untreated animals throughout the experiment in both yearling and adult

buffaloes. This was probably due to the drug was effective in eliminating the liver flukes, therefore the treated animals can consume and utilize more food than the untreated animals. Thus, it supported the findings of Sukhapesna (1981, 1982) that average weight gain of the anthelmintic treated animals was more than that of the untreated animals.

The data also indicates that fascioliasis had effect on working capacity in buffaloes. This was evident that a number of plowing hours with in 1 day in the treated animals was more than that in the untreated animals 2 to 4 times. This was probably due to the infected animals was unhealthy conditions. Therefore, they could not tolerate to work hard as the healthy animals.

The result of the present trial shows that fascioliasis had effect on reproductive performance. This was proven that age at puberty and age at firstcalving in the nitroxynil-treated group was shorter than that in the untreated group. Moreover buffalo cows with previous history of infertility became fertility after treatment with nitroxynil. This was probably due to a reduction in the efficiency of feed utilization and a reduction of feed intake during the reproductive cycle. This has been demonstrated by Elsley et al. (1968) that at low feed intake level, weight losses occurred and accompanied by the continued depletion of reserve fat levels must lead to reduced reproductive performance.

Fascioliasis had effect not only on animal production but also on animal health. Because the infected animals were unhealthy conditions. They showed signs of sickness as anorexia, anemia, emaciation, prostation and even death in a severe case.

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ผลของพยาธิใบไม้ในตับต่อผลผลิตในกระบือ

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บทคัดย่อ

ศึกษาผลของโรคพยาธิใบไม้ในตับต่อผลผลิตในกระบือที่ได้รับพยาธิตามธรรมชาติทั้งเพศผู้และเพศเมีย พบว่ากระบือที่เป็นโรคพยาธิใบไม้ในตับจะแสดงอาการป่วยให้เห็นและทำให้สัตว์ล้มตายในรายรุนแรง แต่กระบือที่ให้ยาถ่ายพยาธิจะมีสุขภาพแข็งแรง น้ำหนักเฉลี่ยที่เพิ่มขึ้นในกระบือที่ให้ยาไนโตรไซนิล ทั้งในกระบือรุ่นและกระบือโตจะมากกว่าในกระบือพวกที่ไม่ให้ยา จำนวนชั่วโมงที่ไถนาได้ใน 1 วัน ในกระบือที่ให้ยาจะมากกว่าของกระบือไม่ให้ยา อายุเมื่อผสมพันธุ์ได้และอายุที่ให้ลูกครั้งแรกในกระบือที่ให้ยาจะน้อยกว่าในกระบือที่ไม่ให้ยา แม่กระบือที่มีประวัติผสมไม่ติดจะผสมติดหลังจากให้ยาไนโตรไซนิล

คำสำคัญ : พยาธิใบไม้ในตับ ผลผลิตในกระบือ ไนโตรไซนิล

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