

## EVALUATION OF MOLLUSCICIDING IN THE CONTROL OF BILHARZIASIS AND PROBLEMS IMPEDING COMPLETE CONTROL OF THE DISEASE IN IRAN\*

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### ABSTRACT

The effect of the mollusciciding of 364 different snail habitate with Bayer 73 (Bayluscide), undertaken during the period January 1968 to January 1973, for the control of urinary bilhaziasis has been evaluated in Khuzestan, southwest Iran.

The criteria for assesment were as follows:

1. Complete kill was obtained when no live *B. truncatus* were found in monthly surveys for one entire year after mollusciciding;
2. Faliure occured when one or more live anails were found by monthly surveys during one year.

Complete kill ranged from 53.7% in 1969 to 59.7% in 1968, and the difference in the percentage of complete kill observed in various years was not significant. The highest percentage of complete kill was achieved in ponds and the lowest canals.

The results obtained from this evaluation indicate that 1) there is no possibility of *Bulinus truncatus* snails building up a resistance to the

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molluscicide used in this study; and 2) by the increase in the number of snail habitats with running water in the endemic area of Khuzestan, as the result of a huge program of extension of irrigation networks already underway, the destruction of the snail intermediate host will become increasingly difficult in the future.

## INTRODUCTION

Successful reduction of the prevalence of urinary bilharziasis has been achieved in Iran using the combined methods of mollusciciding, mass-treatment, engineering and environmental control (Arfaa *et al.*, 1967, 1970).

Mollusciciding has been the most effective means for the destruction of snails and the interruption of transmission.

In this paper, the results of the assessment of the effectiveness of mollusciciding in the destruction of snails in various habitats during several years of activity are presented.

## MATERIAL AND METHOD

Out of 3073 potential snail habitats surveyed during the period from January 1968 to January 1973, *Bulinus truncatus*, the snail intermediate host of urinary bilharziasis, was found in 364 habitats, including 97 canals, 74 drains, 90 swamps and 103 ponds and side-pools.

Snail-infested habitats were treated with Bayer 73 (Bayluscide) as soon as they were found positive. Mollusciciding was repeated as soon as the habitats became reinfested. Treated habitats were checked 5 days after mollusciciding and at monthly intervals thereafter.

Criteria for the assessment of the effectiveness of mollusciciding were as follows:

1. Complete kill was obtained when no live *B. truncatus* were found in monthly surveys for one entire year after mollusciciding;
2. Failure occurred when one or more live snails were found by monthly surveys during one year.

## RESULTS OF MOLLUSCIDING OPERATIONS

The results of assessment of the effectiveness of mollusciciding in various years from 1968-1973 are summarized in Table 1. As indicated in this table, the complete kill observed ranged from 53.7% in 1969 to

59.7% in 1968. As also indicated in this table, the difference between the percentages of complete kill observed in various years does not differ considerably and statistical analysis shows that the difference are not significant. The results obtained according to the type of habitat in various years are shown in Table 2. As indicated in this table, the highest percentage of complete kill was achieved in ponds and the lowest in canals. Variations in the percent of complete kill observed in different years were higher in running water than in stagnant water. Of 3073 potential and active habitats searched during this period in 673 villages, 364 were found to be infested with *B. truncatus*.

Of the treated habitats, 210 or 57.7% have remained negative up to end of 1973. The number and type of newly infested habitats found each year from 1968 to 1973 are presented in Table 3.

An evaluation of the relationship between complete kill and yearly rainfall showed negative results.

## DISCUSSION AND CONCLUSION

The results obtained from this study indicate that the percentage of failure in the destruction of snails has not increased during the years of operation, and thus the possibility of the building up of resistance to molluscicides in snails can be ruled out.

The fact that mollusciciding is more effective in habitats having stagnant water than in those with running water is important, since the number of habitats with running water will gradually be augmented in the bilharzia infested area in Khuzestan and this may diminish the amount of success of mollusciciding in this area.

Table 1

Effectiveness of mollusciciding based on percentages of complete kill and failure observed in various years from 1968-1973

	Years				
	1968	1969	1970	1971	1972
Habitats treated	134	93	142	138	96
Complete Kill	80 (59.7)	50 (53.7)	77 (54.2)	76 (55.0)	54 (56.2)
Failure	54 (40.3)	43 (46.3)	65 (45.8)	62 (45.0)	42 (43.8)

Table 2  
 Number and percentage of complete kill of *B. truncatus* observed in  
 various habitats in different years (Khuzestan, 1968-1972)

Type of Habitat	1968		1969		1970		1971		1972	
	No. of Habitats	Complete Kill %	No. of Habitats	Complete Kill %	No. of Habitats	Complete Kill %	No. of Habitats	Complete Kill %	No. of Habitats	Complete Kill %
Standing Water	31	64.6	12	83.4	20	55	39	69.3	20	75
	10	60	6	66.7	12	58.4	3	66.7	3	66.7
	36	72.3	18	87.5	32	78.2	31	77.5	25	92
Running Water	37	43.2	36	38.9	45	33.3	37	16.2	27	22.2
	20	60	21	28.5	33	57.6	28	60.8	21	38
TOTAL	134	59.7	93	53.7	142	54.2	138	55	96	56.2

**Table 3**  
**Type and number of newly infested habitats found in**  
**various foci of Khuzestan during 1968-1973**

Type of habitats		No. of newly infested habitats						
		1968	1969	1970	1971	1972	1973	Total
Running Water	Swamp	6	2	16	19	22	17	82
	Sidepool	2	6	5	2	1	3	19
	Pond	12	18	18	8	20	7	83
Standing Water	Canal	23	28	12	5	10	9	87
	Drain	12	15	9	7	21	6	70
Total		55	69	60	41	74	42	341

### REFERENCES

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