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Field Trials in Egypt with ICI 24223, Bayluscide and Sodium Pentachlorophenate Molluscicides *

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Parallel field trials have been conducted in Egypt to determine the relative efficacy for bilharziasis control of some new molluscicides and one in current use. In the field trials, Bayluscide and two formulations of ICI 24223 were compared with each other and with sodium pentachlorophenate. All the compounds were highly molluscicidal, but when judged on a basis of cost, ease of application and labour required, Bayluscide appeared to perform better than the others. If improved formulations of ICI 24223 could be made, the choice would be more difficult. Sodium pentachlorophenate, though effective, required high concentrations, and difficulties were encountered in handling the chemical.

INTRODUCTION

In some areas the ecological control of the intermediate hosts of the human schistosomes may be more permanent and cheaper in the long run than the use of molluscicides. However, the former usually requires a large initial investment, and it is especially difficult to implement where old irrigation schemes serve as the habitat for the aquatic intermediate hosts of *Schistosoma haematobium* and *S. mansoni*. It is concluded, therefore, that molluscicides will play an essential role in the control of bilharziasis in the established irrigation schemes in Egypt for a long time to come.

Since the application of molluscicides will involve recurrent expense each year for many years, it is essential that the most efficient and least costly compounds and methods of application should be used. In recent years several new molluscicides have been developed. To judge their relative value, it is necessary to compare them, in parallel field trials, with the chemicals used at present. This paper presents the results obtained in such field trials, using sodium pentachlorophenate, Bayluscide [6] and ICI 24223.[7] Acrolein herbicide-molluscicide was tested at the same time, and the results obtained have been reported by Unrau et al. (1965).[8]

The molluscicides were applied almost simultaneously during May and June 1962. Studies of the snail populations in the project area and their infection rates throughout the previous year had shown that applications of molluscicides at this time would probably eliminate peaks in snail density and cercarial production. The effects of the applications were followed for one year.

FIELD TRIALS WITH ICI 24223

At the time of the trials, two formulations of ICI 24223 [9] were available. The first formulation consisted of two different samples of the base, which had been dissolved in toluene. One of these was a 40% solution and the other contained 43% of the active ingredient. A total of 6 kg of this formulation, containing 2.49 kg of the active ingredient, was available for the experiment. Unpublished reports had indicated that this formulation was more effective in static than in flowing water. The present test was undertaken to determine whether this was true under conditions that exist in many of the irrigation canals in Egypt.

The second formulation of this compound was the hydrochloride, prepared as a dispersible powder

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[6] 5-Chlorosalicylic acid-(2-chloro-4-nitro) anilide.

[7] Isobutyl-triphenyl-methylamine.

[8] See article on page 249 of this issue.

[9] A product of Imperial Chemical Industries Ltd, United Kingdom.

and containing 88.8% of the active ingredient. A total of 2.24 kg of this material was available for the field trial. When this formulation was prepared it had been expected that it, too, would be used in static water. Since slowly flowing water is the predominant habitat for the intermediate host of *Schistosoma haematobium* and *S. mansoni*, the present test was made to determine whether this formulation would be effective in the canals of the Nile Delta.

First trial

The small El Omara canal was selected for the application of the samples of the toluene solution of the ICI 24223 base, and the El Qudah canal served as a control. The experimental canal is 660 m in length, about 1 m in width, and it supplies three field channels. It receives its water direct from the Mahmudiya canal. Snail-population studies were conducted in the same way as in the acrolein field trials (Unrau et al., 1965). Three collecting stations were located along the length of the experimental canal, and three more were on the control canal. Thirty samples were taken at each station, the total number of samples in each survey from each canal being 90.

Pretreatment inspection showed that it would be difficult to obtain a uniform flow through the canal during the period of application. An attempt was made to obtain more suitable conditions by adjusting the gate and using a pump. During the 8-hour period of application (3 June 1962), the rate of flow at the point of introduction was 152 m^3/h. Unfortunately, the flow in the field channel where the pump was located could be maintained for only 2 hours. Atmospheric temperature ranged from 28°C to 35°C, and the water temperature remained at 28°C throughout the application. The chemical solution was metered out of a mixing drum into the suction side of a small centrifugal pump (1000 gal/h) to give a concentration of 2 ppm in the canal. This method was used to ensure constant suction for metering and good mixing of the chemical into the water of the canal. It was found that the formulation becomes sticky as the toluene evaporates, which makes it somewhat inconvenient to dispense.

The results of the trial are summarized in Table 1. Because of other pressing needs and a limited number of workers, surveys of the control canal were suspended for three months, from August to October. The data have been statistically analysed by the methods described by Yeo (1962) and Hairston (1965).[1] In the case of *Bulinus*, it was found that 95.1%, 93.99% and 96.21% of the snails, respectively, had been eliminated when collections were made 48 hours, 1 week and 1 month after the application. The corresponding figures for the elimination of *Biomphalaria* were 99.64%, 99.44% and 100% respectively. It is apparent from the data obtained from the monthly collections that *Biomphalaria* was brought under control and that there would have been little likelihood of *S. mansoni* transmission in this canal during the 12-month period. However, the *Bulinus* collections in both the experimental and the control canals indicate that factors other than the molluscicide application were involved. While the heavy population of this species had been greatly reduced by the molluscicide, there appeared to be enough snails left in the experimental canal to repopulate the habitat rapidly and to produce at least some cercariae. In spite of the survival of some snails, the density of the *Bulinus* population continued to decrease for four months. After that time it gradually increased, but the colony remained a mere shadow of the original population. The factors involved were not determined.

Second trial

The Khurshid canal was selected for the field test of the ICI 24223 hydrochloride dispersible-powder formulation. It is 1760 m long, obtains its water direct from the Mahmudiya canal, and it has an average daily flow of 7200 m^3. Vegetation in the canal consisted of *Panicum repens* and *Potamogeton crispus*. As will be seen in Table 2, the *Bulinus* population was sparse, but *Biomphalaria* was common.

The Hod El Malaha canal was selected as a control. It is 765 m in length and the maximum daily discharge is 11 250 m^3. In other respects it appeared to be quite similar to the experimental canal. Three collecting stations were established on each of the two canals, and samples were taken in a similar manner to that described for the previous experiment.

The chemical was applied (22 July 1962) as a suspension from a mixing container placed over the canal, the calculated dose being 0.5 ppm for 12 hours. The mixture was stirred from time to time to ensure reasonably constant suspension. Analysis of the treated water, using the method developed by Meyling, Schutte & Pitchford (1962), showed that the average concentration in the canal was 0.54 ppm.

[1] See article on page 289 of this issue.

TABLE 1

SNAIL-POPULATION DATA, FIELD TRIAL WITH ICI 24223 LIQUID FORMULATION

Time of survey	Treated canal — El Omara						Untreated control canal — El Qudah					
	Bulinus		*Biomphalaria*		Egg masses	Remarks	*Bulinus*		*Biomphalaria*		Egg masses	Remarks
	Alive	Dead	Alive	Dead			Alive	Dead	Alive	Dead		
Before treatment												
5 days	3190	11	584	0	101	Predominant weeds *Ceratophyllum demersum* *Panicum repens* and *Potamogeton crispus*	81	0	350	0	5	Predominant weeds *Panicum repens*, *Potamogeton crispus* and *Eichhornia crassipes*
After treatment												
48 hours	189	589	1	38	16	*Potamogeton crispus* dispersed	34	13	191	38	0	
1 week	229	166	2	16	6		26	3	192	8	0	
1 month	119	47	0	14	2		17	6	76	10	2	
2 months	58	281	0	7	0	Low water rotation						
3 months	23	99	0	4	0							
4 months	2	26	0	1	0							
5 months	19	2	0	0	4	Medium water rotation	0	0	37	6	0	Medium water rotation. *P. repens* dispersed
6 months	39	1	0	1	2		0	0	61	9	2	Medium water rotation. Weeds removed from some parts. *E. crassipes* and *P. repens* present
7 months	36	34	1	0	0		0	2	42	38	34	High water rotation. Only *E. crassipes* present
8 months	132	9	0	0	75	High water rotation	0	0	85	17	1	Medium water rotation. *E. crassipes* and *P. crispus* present
9 months	155	9	0	0	4	Medium water rotation	2	0	174	2	0	Low water rotation
10 months	139	2	0	0	3	Low water rotation. Weeds removed from some parts. Few plants of *Ceratophyllum* and *Panicum* present	0	1	339	5	3	Medium water rotation. *E. crassipes*, *P. crispus* and *P. repens* present
11 months	210	1	0	0	131	Medium water rotation	0	0	178	3	2	Low water rotation
12 months	197	3	0	0	52		5	0	244	14	3	Medium water rotation

Survey suspended

The results obtained with the ICI 24223 powder formulation are summarized in Table 2. Analysis of the population data showed that all the *Bulinus* were dead 48 hours and 1 week after the application. The *Biomphalaria* mortality rates were 99.20% and 100% respectively. There was some evidence of recovery by both species 4 months after the application. In the 5th month the *Bulinus* population attained its former density and then went on greatly to surpass this. The recovery of the *Biomphalaria* population was much slower, not reaching a density comparable to that found before the application until the 11th month.

BAYLUSCIDE FIELD TRIAL

A small amount of Bayluscide (Bayer 73) 70% wettable powder [1] was obtained in order to conduct field experiments similar to those described above. Ganabiet Zohra canal, selected for this experiment, is about 3.4 km long with a normal capacity at the headgate of about 41 000 m³/day, taken direct from the Mahmudiya canal. The last 600 m of the Ganabiet Zohra canal consisted of a static water body with very dense aquatic vegetation including

[1] A product of Farbenfabrieken Bayer AG, Federal Republic of Germany.

TABLE 2

SNAIL-POPULATION DATA, FIELD TRIAL WITH ICI 24223 DISPERSIBLE POWDER

Time of survey	Treated canal — Khurshid						Untreated control canal — Hod El Malaha					
	Bulinus		*Biomphalaria*		Egg masses	Remarks	*Bulinus*		*Biomphalaria*		Egg masses	Remarks
	Alive	Dead	Alive	Dead			Alive	Dead	Alive	Dead		
Before treatment												
6 days	35	1	214	9	0	Low water rotation. Predominant weeds present *Potamogeton crispus* and *Panicum repens*	39	56	25	11	0	Low water rotation. Predominant weeds present *Ceratophyllum demersum* and *Panicum repens*
After treatment												
48 hours	0	59	1	181	0	Low water rotation. *P. crispus* losing its leaves	5	13	7	8	0	High water rotation. Few plants of *P. repens* and *Ceratophyllum*
1 week	0	110	0	175	0	Low water rotation. No *P. crispus*	5	11	9	20	0	Low water rotation
1 month	1	26	0	34	0	Low water rotation						
2 months	1	37	1	47	0	Medium water rotation. Few *P. repens* and appearance of *Eichhornia crassipes*	Survey suspended					
3 months	0	7	0	12	0							
4 months	9	3	32	86	0		96	2	65	21	5	High water rotation
5 months	44	10	20	8	2	Low water rotation. *P. crispus* observed, in addition to *P. repens* and *E. crassipes*	35	2	31	5	0	Low water rotation. Water not covering the weeds
6 months	137	7	35	14	144	Appearance of *Ceratophyllum demersum*. No *E. crassipes* observed	4	7	17	7	20	Low water rotation. *Potamogeton crispus* appeared
7 months	292	2	77	6	285	High water rotation. *C. demersum* disappeared. Only *P. repens* and *P. crispus* remain	22	0	29	6	4	Low water rotation. *Ceratophyllum* disappeared
8 months	409	0	98	0	80	Medium water rotation	5	0	7	4	0	Medium water rotation. Silt at first and second stations removed
9 months	106	31	22	16	0	Low water rotation. Silt removed from some parts. Few *P. repens* and *P. crispus*	76	0	26	3	6	Low water rotation
10 months	200	9	75	13	4	Medium water rotation. *P. repens* only	167	0	51	2	26	Medium water rotation. *P. repens* and *P. crispus* general in canal once more
11 months	167	24	351	28	23	Low water rotation. *C demersum*, *P. repens* and *P. crispus* all present again	299	0	22	1	11	Low water rotation
12 months	16	7	306	28	2	Medium water rotation. Most of *Ceratophyllum* removed. *P. repens* remains	86	0	83	0	5	High water rotation. Few plants of *Ceratophyllum* appea

Potamogeton crispus, *Eichhornia crassipes* (water hyacinth), *Panicum repens* and some *Typa* spp. (cattail).

The selection of this type of canal permitted the use of two different application techniques. The portion with flowing water was treated (11 June 1962) for 8 hours at 1 ppm using the meter-and-pump technique described in the test of the ICI 24223 solution. The canal was flowing at the rate of 42 000 m³/day during the treatment period, requiring a total of 20 kg of the formulation. The weather was clear, and a light wind prevailed. The water temperature was 27°C during the period of application, while the air temperature ranged from 33°C to 38.5°C. The water was slightly turbid owing to silt. Water-sample analysis by Strufe's method (WHO Expert Committee on Bilharziasis, 1961) indicated that the downstream concentration losses were negligible for this length of canal.

In the section of the canal with static water, Bayluscide was applied with a power sprayer. A 2.5% solution was sprayed on this section to give a 1 ppm concentration in the habitat. In order to penetrate the dense vegetation a jet nozzle was used, rather than one giving a fine spray.

The data obtained in this experiment are summarized in Table 3. The estimated mortality rates

TABLE 3

SNAIL-POPULATION DATA, FIELD TRIAL WITH BAYLUSCIDE

Time of survey	Treated canal — Ganabiet Zohra						Untreated control canal — Loqueen					
	Bulinus		*Biomphalaria*		Egg masses	Remarks	*Bulinus*		*Biomphalaria*		Egg masses	Remarks
	Alive	Dead	Alive	Dead			Alive	Dead	Alive	Dead		
Before treatment												
1 day	533	34	70	1	0	Predominant weeds *Panicum repens* and *Potamogeton crispus*	183	6	1	0	0	Predominant weed *Panicum repens*
After treatment												
48 hours	0	226	0	5	0	Low water rotation	20	11	2	1	0	High water rotation
1 week	1	291	0	4	0	High water rotation. *P. crispus* disappeared	87	3	0	0	0	Low water rotation
1 month	2	398	0	13	0	Low water rotation	1	12	0	0	0	High water rotation
2 months	1	165	0	8	0	Low water rotation						
3 months	2	48	0	3	0	High water rotation	Survey suspended					
4 months	12	14	0	1	0	High water rotation						
5 months	86	39	0	0	1	Low water rotation	7	4	0	0	0	Low water rotation
6 months	101	4	1	1	1	Medium water rotation. Appearance of *Eichhornia crassipes*	12	0	0	0	0	Low water rotation
7 months	564	2	0	0	233	Medium water rotation. Reappearance of *P. crispus*	66	5	0	0	6	Low water rotation
8 months	443	2	0	0	266	High water rotation. Appearance of *Sphaeranthus suaveolens*	24	2	0	0	5	Medium water rotation. Weeds removed at first and second stations
9 months	43	6	0	0	2	Medium water rotation. Weeds removed. Few plants of *P. repens* remaining	50	0	0	0	20	High water rotation. *P. repens* returned
10 months	249	6	1	0	18	Medium water rotation	113	0	0	0	20	Low water rotation
11 months	542	9	0	1	13	Medium water rotation. Reappearance of *P. crispus*	262	1	0	0	19	Low water rotation
12 months	357	26	0	2	8	Medium water rotation	180	2	0	0	22	High water rotation

of *Bulinus* 48 hours and 1 week after the application were 100% and 99.74% respectively. The population remained at a very low level for 3 months and then built up to its former density by the 7th month. No living *Biomphalaria* were recovered for 5 months after the application, and only two were found during the entire 12-month period of observation.

SODIUM PENTACHLOROPHENATE FIELD TRIAL

The El Kolliah canal was selected for the field trial of sodium pentachlorophenate (NaPCP). This is a private canal belonging to the Farm Faculty of Agriculture and is about 3 km in length. It takes water direct from the Mahmudiya and has a normal daily capacity of 43 600 m^3. The inlet gate of the canal was closed every night, consequently it was in high rotation during the day and in low rotation at night. Flow in this canal was further complicated by the fact that it served as a drain for another irrigation unit during the period of low rotation.

The Aref canal was considered similar enough to the El Kolliah to serve as a control. Pre- and post-treatment snail-population surveys were conducted in both canals in the same manner as in the previous trials. The following species of snail were found in the two canals at the beginning of the experiment: *Bulinus truncatus*, *Biomphalaria alexandrina*, *Physa*, and various species of operculate. In the experimental canal there were a considerable number of *Lymnea cailliaudi*, the intermediate host for the bovine liver fluke *Fasciola hepatica*. This snail was not present in the control canal at first, but it appeared in small numbers during the latter half of the period of observation.

The molluscicide was applied at the head of the experimental canal, near the inlet from the Mahmudiya, simply by allowing the proper amount of concentrated solution to run into it from a mixing drum (55 gal) placed over a culvert. The rate of flow was regulated by means of an ordinary 0.5-inch gate valve in the bottom of the drum. Several falls in water level a short distance below the point of application ensured uniform dispersion of the chemical throughout the water.

The application of the molluscicide was started shortly after the gate was opened at 7.30 a.m. (23 June 1962) and was continued until 5 p.m. There was bright sunshine throughout the day; the air temperature ranged from 26°C to 29°C, and the water temperature remained at 33°C during the period of application. The water in the canal was slightly turbid. The treated water was periodically sampled at various sites along the canal, and the concentration of sodium pentachlorophenate was determined by Haskins's method (1951). The results indicated that the chemical moved downstream at a rate of approximately 0.26 km/h.

In an attempt to prevent the introduction of snails from the irrigation system that drained into the experimental canal at night, the small field channels and drains of this system were sprayed with sodium pentachlorophenate solution. Two knapsack sprayers were used for this application, which was made while the El Kolliah canal was being treated.

The results obtained with NaPCP are summarized in Table 4. The experimental canal was essentially negative for all three species of intermediate host for 1 month after the application. In the 2nd month the *Bulinus* and *Biomphalaria* populations gradually began to increase in density, but did not reach former levels during the period of observation. *Lymnaea* appeared in the 4th month, and by the 12th month the population was approaching its former density. As has been reported repeatedly by others, the data indicate that this compound is an effective ovicide at molluscicidal concentrations.

It will be noted that the *Bulinus* and *Biomphalaria* populations in the control canal were subject to wide fluctuations and also that a few *Lymnaea* were present in this canal after the 5th month.

DISCUSSION AND CONCLUSIONS

All the compounds used were highly molluscicidal at the concentrations applied. The toluene solution of the ICI 24223 base was more difficult to handle and to apply than the other materials tested. At a concentration of 2 ppm for 8 hours, this formulation did not give such good results as the dispersible-powder formulation of the hydrochloride, since it did not give adequate control of *Bulinus*. However, it appears that *Biomphalaria* was brought under control for a period of 12 months by the ICI 24223 solution. In the canal where ICI 24223 dispersible powder was used at a concentration of 0.54 ppm for 12 hours, there was no evidence of resurgence by either species of intermediate host until 4 months after the application.

When Bayluscide was applied at the rate of 1 ppm for 8 hours, the *Biomphalaria* disappeared, and this species did not repopulate the habitat for a period of 12 months. There was some evidence of

TABLE 4

SNAIL-POPULATION DATA, FIELD TRIAL WITH SODIUM PENTACHLOROPHENATE

Time of survey	Treated canal—El Kolliah							Untreated control canal—Aref						
	Bulinus		*Biomphalaria*		Egg masses	*Lymnaea* (Alive)	Remarks	*Bulinus*		*Biomphalaria*		Egg masses	*Lymnaea* (Alive)	Remarks
	Alive	Dead	Alive	Dead				Alive	Dead	Alive	Dead			
Before treatment														
1 day	1982	7	720	0	14	262	High water rotation. Predominant weeds *Potamogeton crispus*, *Eichhornia crassipes* and *Panicum repens*	202	71	301	67	4	0	Low water rotation. Canal free of weeds
After treatment														
48 hours	0	95	0	137	1	0	High water rotation	171	18	242	45	0	0	Low water rotation
1 week	0	225	0	123	2	0	High water rotation	142	22	192	12	0	0	Low water rotation
1 month	0	19	1	51	0	0	High water rotation	15	15	14	19	0	0	Medium water rotation
2 months	2	43	2	28	0	0	High water rotation							
3 months	2	112	4	58	0	0	High water rotation. Weeds removed. Few *E. crassipes* remain							
4 months	8	3	12	17	0	3	High water rotation. Few *E. crassipes* and *P. repens*							
5 months	75	6	35	16	5	3	Medium water rotation	1	15	44	31	0	1	Low water rotation. *P. repens* and *E. crassipes* present
6 months	142	9	79	10	11	41	Medium water rotation	23	5	53	25	1	2	Low water rotation
7 months	103	2	35	9	10	15	High water rotation	16	7	102	35	9	1	High water rotation. Appearance of *Sphaeranthus suaveolens*
8 months	52	12	27	8	4	2	High water rotation. Weeds removed from some parts	55	2	197	17	8	0	Low water rotation. Appearance of *P. crispus*
9 months	237	0	20	0	14	1	High water rotation. Reappearance of *P. crispus*	40	0	65	4	2	7	High water rotation. No *S. suaveolens*
10 months	865	0	33	0	49	15	Medium water rotation	76	0	74	4	1	1	High water rotation
11 months	689	1	408	0	11	117	Medium water rotation	475	5	1286	4	0	6	Medium water rotation
12 months	333	2	183	3	33	213	Medium water rotation	236	1	680	10	4	3	Medium water rotation

Survey suspended

Bulinus population resurgence 4 months after the application, but it did not reach levels comparable to the pretreatment population until the 7th month.

In the canal treated with sodium pentachlorophenate at a concentration of 9 ppm for 9½ hours, both of the schistosome intermediate hosts and *Lymnaea cailliaudi* were eliminated for 1-3 months. In the months that followed, populations of all three species again reached dangerous densities. While data are not available from the canals where ICI 24223 and Bayluscide were applied, it is suspected that these compounds would also be effective against *L. cailliaudi*, the snail that serves as an intermediate host for the liver fluke of cattle.

Previous tests with Bayluscide and sodium pentachlorophenate have shown that both compounds are ovicidal at molluscicidal concentrations. All laboratory tests with ICI 24223 have indicated that this compound is not directly ovicidal. However, there have been some reports that the young from eggs exposed to this compound do not develop, although these observations have not been confirmed

by all research workers. It is of interest to note that in these field trials there was no evidence that the population-recovery pattern was in any way modified by a lack of ovicidal effect with ICI 24223.

In all the experimental canals, there was evidence of snail-population resurgence by November or December. It appears that it would be necessary to apply a molluscicide again in October or November, in order to obtain adequate snail control.

When plans for these experiments were made, it had been feared that snails entering from the Mahmudiya canal would be an important factor in the repopulation of the treated canals. Since it was impracticable to apply the molluscicide to this large transportation-irrigation canal, it was expected that it might be necessary during actual snail-control operations in the project area to install mechanical barriers at the irrigation-canal intakes. They were not used during these experiments, and the data obtained indicate that they will not be necessary. This will simplify and reduce the cost of control in this area. It is believed that the low velocity of the water in the Delta is one of the reasons for the results obtained. Also, long-term studies of the snail populations in the Mahmudiya indicate that this canal is not a particularly good habitat for *Bulinus* and *Biomphalaria*.

The cost of the chemical, the ease with which it can be applied, and the amount of labour required are all important considerations in a mollusciciding programme. Of the three compounds tested, Bayluscide best met these considerations, although if improved formulations of ICI 24223 could be made it would be more difficult to choose. The concentration required and the difficulties encountered in handling sodium pentachlorophenate, because of its irritating properties to the skin and mucous membranes, which involve the use of masks and gloves, place this highly effective compound at a disadvantage.

The experience gained from these experiments emphasizes the fact that, during molluscicide operations, the snail-control team must have complete control of the flow of water in the canals.

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RÉSUMÉ

Cet article présente les résultats d'une étude comparative de l'efficacité de deux nouveaux molluscicides, le Bayluscide et l'ICI 24223, et du pentachlorophénate de sodium.

Au cours d'essais sur le terrain, ces différents produits ont témoigné, aux concentrations utilisées, d'une action molluscicide élevée, et ont détruit les *Bulinus* et les *Biomphalaria* dans la proportion de 93,99-100%. L'ICI 24223 s'est montré moins actif en solution que sous la forme de poudre dispersable, et à l'opposé des deux autres produits expérimentés n'a fait preuve d'aucune activité contre les œufs de mollusques. Le Bayluscide s'est révélé le plus intéressant en raison de son prix et de sa facilité d'emploi entraînant une économie de main-d'œuvre. Quant au pentachlorophénate de sodium, il agit à forte concentration sur les mollusques et leurs œufs, mais il est d'un emploi malaisé.

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