

# Observation on the movement of the New Zealand flatworm under field conditions



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The New Zealand flatworm is an obligate predator of native earthworms in the British Isles and is associated with detrimental impact on earthworm numbers and possible degradation of the biodiversity of above and below ground faunal

biodiversity (Boag, 2000, Jones *et al.* 2001). Although the “macro” spread of the New Zealand flatworm throughout the British Isles has been probably due to mans activities there has been little research into its localised spread and movement.

## Materials and Methods

New Zealand flatworms were released (in a field which already had flatworms present around the periphery but in an area where no flatworms were present) in the centre of a square of traps placed at 3 m intervals in October and repeated in May. Flatworms and earthworms from under the traps were counted and weighed weekly for c. 6 weeks.

## Results

Flatworms put out in October travelled up to 24 m in 26 days (0.92m per day, mean c.0.25m) (table 1) while the comparable figure for flatworms (to travel 24 m) released in May was 21 days (1.14m per day, mean c.0.25m) (table 2).

Table 1 Migration - May

Distance of traps from a central release point	Date								
	16/10/99	22/10/99	28/10/99	4/11/99	11/11/99	17/11/99	26/11/99	6/12/99	7/1/00
0m*	154	19	15	5	4	4	3	4	6
1m	0	16	25	13	8	12	13	6	6
3m	0	3	9	6	8	5	6	6	7
6m	0	1	2	1	0	2	2	2	2
9m	0	1	1	1	2	1	0	3	1
12m	0	0	1	2	3	0	1	2	0
15m	0	0	0	1	1	2	0	1	0
18m	0	0	0	0	1	2	2	2	1
21m	0	0	0	0	1	0	2	1	2
24m	0	0	0	0	1	0	1	1	0
Number of flatworms recovered									
	154	40	53	29	29	28	30	28	25
Mean distance recovered flatworms had travelled (m)									
	0	0.925	1.6	2.9	5.66	4.07	5.33	6.54	4.32
Standard error									
		2.3	2.7	1.3	0.9	1.6	1.2	0.6	0.9

Table 2 Migration - October

Distance of traps from a central release point	Date							
	9/5/00	16/5/00	22/5/00	23/5/00	30/5/00	7/6/00	13/6/00	14/7/00
0m*	231	11	4	1	5	3	2	1
1m	0	35	17	11	12	12	4	2
3m	0	23	13	7	9	14	9	1
6m	0	4	5	4	8	8	4	0
9m	0	2	4	2	6	1	4	6
12m	0	3	2	3	2	5	3	3
15m	0	2	4	3	1	5	2	1
18m	0	0	2	2	3	0	0	0
21m	0	0	0	0	1	4	3	2
24m	0	0	0	0	1	1	3	2
Number of flatworms recovered								
	231	80	51	33	48	53	34	18
Mean distance recovered flatworms had travelled (m)								
	0	2.65	4.75	6.33	5.85	6.68	8.59	11.11
Standard error								
		3.8	1.8	1.1	1.2	1.5	0.7	1.5

\* Data for 0m is from one trap while that for the distances 1-24m are from four traps

The impact of the release of flatworms in October on earthworm numbers showed that earthworm numbers were reduced near to where the flatworms had been released (tables 3 & 4).

Table 3 Earthworm distribution - May

Distance of traps from a central release point	Date								
	16/10/99	22/10/99	28/10/99	4/11/99	11/11/99	17/11/99	26/11/99	6/12/99	7/1/00
0m*	5	0	1	1	2	2	0	4	0
1m	23	5	5	4	6	2	8	11	4
3m	18	15	16	15	6	8	11	16	4
6m	25	20	19	21	17	6	13	19	11
9m	16	18	20	16	20	10	19	22	10
12m	24	23	23	20	18	18	23	24	16
15m	24	26	30	20	14	18	14	35	16
18m	19	17	26	15	29	19	20	21	17
21m	15	11	22	23	25	19	15	34	16
24m	20	23	23	17	22	22	13	29	13
Total number of earthworms									
	189	158	185	152	159	124	136	215	107

Table 4 Earthworm distribution - October

Distance of traps from a central release point	Date							
	9/5/00	16/5/00	22/5/00	23/5/00	30/5/00	7/6/00	13/6/00	14/7/00
0m*	6	1	0	1	1	1	7	1
1m	23	2	6	4	8	5	10	1
3m	24	4	13	15	17	9	17	5
6m	22	19	17	13	19	18	22	11
9m	23	15	18	27	27	23	20	8
12m	37	20	27	25	29	18	24	8
15m	28	15	31	18	36	21	20	16
18m	25	25	29	33	34	29	23	10
21m	29	29	31	29	36	27	35	14
24m	24	27	26	22	26	29	26	9
Total number of earthworms								
	241	157	198	187	233	180	204	83

## Discussion

These results have shown that the New Zealand flatworm can, under field conditions, move approximately 1m per day and that where present have a marked detrimental impact on earthworm numbers. This would suggest that the flatworm once it had been

introduced and become established in an area would within a number of years be capable of infesting large areas of farmland. Therefore every effort should be made to stop its spread by mans activities e.g. on the transfer of bales of hay/silage from farm to farm.

## References

- Boag B. (2000) The impact of the New Zealand flatworm on earthworms and moles in agricultural land in western Scotland. *Aspects of Applied Biology* 62: 79-84.
- Jones HD; Santoro G; Boag B; Neilson R. (2001) The diversity of earthworms in 200 Scottish fields and the possible effects of the New Zealand flatworms (*Arthurdendyus triangulatus*) on earthworm populations. *Annals of Applied Biology* 139: 75-92.