

Herpetofauna Pet-Keeping by Secondary School Students: Causes for Concern

Ian Bride[1]
DURRELL INSTITUTE OF CONSERVATION AND ECOLOGY
UNIVERSITY OF KENT AT CANTERBURY, UNITED KINGDOM

This study of the patterns of the keeping of herpetofauna animals and associated animal welfare issues among secondary school pupils in the United Kingdom suggests that a large proportion of the animals kept as companion animals by this group are indigenous species. In comparison with purchased species, these captured animals, even those normally long-lived, appear to suffer a high rate of mortality. Relatively large numbers of escape- and food-related deaths among these animals imply that many are not furnished with suitable vivaria or adequate care. Traded reptile and amphibian species were reported to have been kept by nearly 40% of the students who said they had kept herpetofauna, and the proportions of most taxa reflected their availability in shops. Data concerning students' opinions about their own care-knowledge appeared to support the general conclusion that students have much to learn about keeping reptiles and amphibians. These findings are considered in relation to issues of animal welfare and herpetofauna conservation. Their ramifications for school-based education about reptiles and amphibians are also discussed.

The attraction of humans to nonhuman animals may be innate (Hair & Pomerantz, 1987; Kellert & Wilson, 1993), but even if it is not, the educational value of animals is widely accepted. In relation to companion animals there is evidence to support this view. The childhood experience of keeping companion animals has been found to have significant positive effects on later attitudes towards companion animals (Serpell, 1981) and towards wildlife in general (Paul & Serpell, 1993). It is also thought to aid a person's general moral and social development (Brown, 1988; RSPCA, 1995). Yet significant animal welfare issues have been associated with pet ownership and the pet trade, and organizations such as the Royal Society for the Prevention of Cruelty to Animals (RSPCA), Britain's leading animal welfare organization, continue to spend a lot of time and effort addressing them.

With the welfare of companion animals being one of the RSPCA's top priority areas (RSPCA, 1991), understandably, prominence has been given to the most

popular companion animals, notably cats and dogs. However reptiles and amphibians (herpetofauna), despite being among the least popular groups of animals (Surinova, 1971), are the focus of considerable fascination on the part of many children (Bell, 1991) and adults (Murphy & Mitchell, 1989). Certain of the hardier species make unusual, interesting, and relatively undemanding companion animals and are particularly suitable for those with little space and/or busy lifestyles. Whatever the reasons, in the United Kingdom at least, the keeping of herpetofauna is on the increase (Smart & Bride, 1993).

In recognizing this development, and in response to a widening of public interest in animal welfare issues, in 1989 the RSPCA commissioned the Durrell Institute of Conservation and Ecology to conduct a study of the welfare aspects of the U.K. trade in reptiles and amphibians as companion animals (Smart & Bride, 1993). At the time, few data were available on the herpetofauna pet trade, and its welfare aspects were the subject of (sometimes wild) speculation. Part of this study consisted of a survey of herpetofauna-keeping by students, and the results of this survey are reported here. The objective was to obtain data on the types of reptiles and amphibians being kept by students and assess any associated animal welfare problems. The findings are considered in relation to general animal welfare issues, to herpetofauna conservation, and to possible ramifications for school-based education about reptiles and amphibians.

Data Collection

Attempts to gather data using posted survey packets targeted at teachers known to be sympathetic to environmental issues produced just one response from fifty. The researcher recognized that school visits were necessary if sufficient data were to be collected. However, a pilot survey of 250 boys in a private school in Bristol found only 5% of students reporting herpetofauna kept as companion animals. Obtaining data by survey work in a classroom setting was rejected as unsuitable on the grounds that it would either involve a small section of any one class or, if integrated into other activities, would be too time-consuming. Instead, schools were offered a morning assembly presentation on the topic of keeping companion animals in exchange for allowing those students who had kept reptiles and amphibians to stay behind for a few minutes for a quick questioning exercise. They were to be asked about types of reptiles and amphibians they had kept as companion animals, the period of care, the origin of the animals, the causes of death where thought to be known, and whether they regarded their care-knowledge as adequate for each companion animal. Given the constraints on the researcher's and students' time,

this method proved successful in gathering data, the schools being eager to include a novel assembly topic.

Approximately[2] 2,530 secondary school students were thus surveyed across eight schools in the Canterbury area during September 1992. Three of the schools chosen were grammar schools (G), two were technical high schools (T) and three were secondary modern schools (M). The intention in making this selection was to obtain some degree of comparison across different levels of social class.[3] A broad taxonomic categorization derived from the availability of animals in retail outlets (Smart & Bride, 1993) and including local British species was employed. Students were asked to report on members of major taxonomic groups (newt, frog, terrapin, etc.) and some more specific taxa (slow-worm, or *Anguis fragilis*, the indigenous legless lizard,and python/boa) which they had kept as companion animals. Care was taken to order questions so as to minimize confusion. For example, questions concerning slow-worm ownership were positioned before those dealing with other lizards or snakes, and it was pointed out that slow worms are actually a type of lizard. However, some pupils may still have based their answers upon mistaken identifications, for instance confusing newts with lizards, or frogs with toads. In order to address the problem of those who had kept more than one individual of each taxon, the students were repeatedly asked to report on the particular animal they had been keeping most recently. Furthermore, it was stressed that the information being sought concerned animals which had been regarded as companion animals by the students, rather than those they had simply taken home and released almost immediately. Despite some limitations on the quality of the data collected, the survey provides interesting preliminary findings in an area previously unstudied, and yields useful suggestions for further research.

Results

As Table 1 illustrates, between 4 and 32% of the students in each school sample reported having kept reptiles or amphibians as companion animals, with an overall proportion of 11% of the survey population and a girl/boy ratio in the sub-sample of 2:3 (that of the overall sample being approximately 1:1). The reliability of these unaggregated data is to be regarded with care for a variety of methodological and practical reasons. Thus, the researcher observed that in those schools where assemblies included upper school year groups (F, G and H), the number of self-reporting herpetofauna-keepers in the older age groups was low. Herpetofauna-keeping may have recently grown among younger age groups, but a more plausible explanation is that older students were less able or willing to remain behind for

questioning. The effect of this non-reporting would be to exaggerate overall numbers downwards. However, there were also instances in which a few of the youngest students appeared to be raising their hands in jest or out of a desire to participate; behavior which would tend to exaggerate figures upwards. Both tendencies would act to skew the data towards the younger students, but more conventional survey techniques would have been open to similar distortions.

Notwithstanding these observations, the data in Table 1 suggest two major points of interest. The first is that the percentage of respondents is lowest for grammar schools (6%), higher for technical high schools (13%) and highest for secondary modern schools (24%). Although this pattern might simply be linked to the self-selection of the sub-samples associated with the different representation of year groups, this would not explain the difference between the technical high schools and the secondary modern schools, whose samples were in the same age range. An alternative interpretation is that these data reflect differences in the keeping of herpetofauna companion animals between different socio-economic groupings of students disproportionately represented across school types. If this is so, then factors such as access to native species, choice of leisure activities, financial resources, regard for reptile and amphibians (and for animals generally),

Table 1. Reported herpetofauna pet-keeping in surveyed schools.

School	Type*	Sample size**	Age range	Those reporting keeping herpetofauna			
				no. of students	% of sample	Boys	Girls
A	M	140	11-12	45	**32**	23	22
B	M	150	13-14	37	**25**	21	16
C	M	170	12-13	28	**16**	18	10
D	T	430	12-14	49	**11**	42	7
E	T	210	11-12	36	**17**	25	11
F	G	640	11-18	26	**4**	7	19
G	G	630	11-18	53	**8**	33	20
H	G	160	14-18	9	**6**	1	8
Total		2070		**283**	**14**	170	113

*where M = secondary modern school, T = technical high school, G = grammar school
**approximate (does not account for absentees)

views on keeping companion animals, and the attitudes of parents might play a part as associated variables.

The second observation to be made of Table 1 is that the numbers of boys (169) and girls (114) reporting having kept herpetofauna are closer than might be expected. Girls' regard for animals could be stereotypically described as a liking for furry mammals and dislike for creatures scaly, slimy, or warty. Reptiles have been found to be disproportionately avoided by females (Hoff & Maple, 1982; McGregor, 1994; Smy, 1995). This survey suggests instead that the popularity of herpetofauna among girls may be not much less than that among boys. It appears to contradict Smy (1995) who found a boy/girl ratio of 9:1 among a sample of children in possession of herpetofauna as companion animals. But boys may tend to keep their companion animals longer, so that although nearly as many girls as boys have tried keeping herpetofauna companion animals, at any one time the number of boys in possession of a reptile or an amphibian is greater. No pattern in the boy/girl ratio of keepers of herpetofauna companion animals was found across the different school types. Gender differences in the keeping of specific taxa had not been recorded and might prove an interesting parameter to investigate in future research.

The aggregated data in Table 2 (Appendix) provide a number of interesting findings. Figure 1 illustrates the numbers of students reporting having kept each animal type as a pet and the proportion describing each animal type as captured as distinguished from purchased. It gives an indication of the relative popularity (or availability) of the different taxa. The high number of students who said they had kept a slow-worm is noteworthy. With regard to traded species, the data affirm the popularity of tortoises and terrapins. Since it is illegal to sell British species, they also suggest that a relatively small number of captive frogs (6% bought), toads (11% bought) and newts (4% bought) were imported species, and, that a significant proportion of the "other snakes" (59% caught) and "other lizards" (73% caught) were of indigenous origin[4], almost certainly nearly all grass snakes (*Natrix natrix*) and viviparous lizards (*Lacerta vivipara*), the only snake and legged lizard found locally. As Figure 1 also demonstrates, the animals reported as having been bought were predominantly tortoises (37% of the total bought animals reported upon), terrapins (29%), snakes (13%) and lizards (11%). Overall, six in every ten of the reptiles and amphibians reported upon had been caught rather than bought. And of these caught animals, in approximately equal numbers, slow-worms and frogs accounted for about half (25% and 26%, respectively), newts and toads one-third (16% and 13%) and "other lizards" and "other snakes" virtually all the remainder.

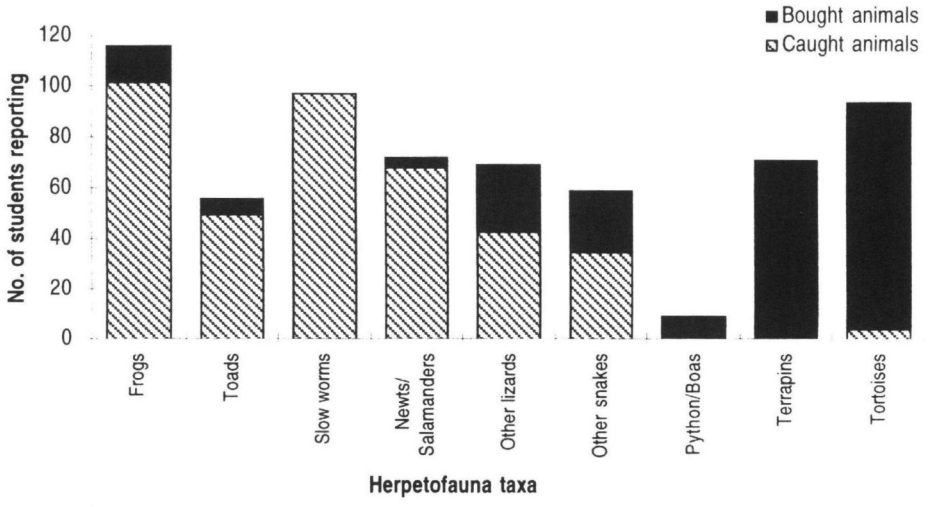

Figure 1. Students reporting having kept each taxon and the origin of the animals concerned.

Comparing the findings for bought taxa with data obtained from a 1992 national survey of U.K. herpetofauna retail outlets (Smart & Bride, 1993), only tortoises and terrapins seem to be kept in disproportionately high numbers by students compared to their retail availability. Otherwise, the relative mix of taxa kept largely reflects the numbers of individual animals found in retail outlets (see Figure 2). Both tortoises and terrapins can live for long periods, and the former are probably individuals obtained prior to the 1983 C2 listing of *Testudo* species under European Commission Directive EC3626/82, which virtually halted imports. They are nowadays hardly available in the shops. The high terrapin numbers can be further explained by the recent "Teenage Mutant Ninja Turtle" fad, which is thought to have led to a temporary increase in terrapin-buying. Besides tortoises, terrapins, and snakes, few students reported the possession of other bought taxa (21% of total purchased taxa reported upon), particularly of amphibians (only 10% of total purchased taxa reported upon).

With regard to the welfare aspects of the survey, the data do not allow for the identification of actual lifespans or an exact relationship between an individual animal's origin and its time and cause of death. However, some general observations can be made. For instance, the largest proportion of animals reported to have

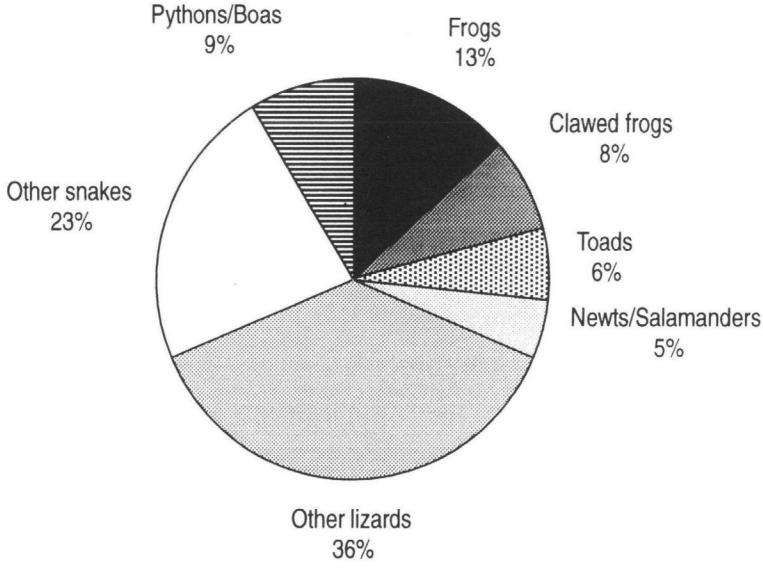

Figure 2a. School survey: percentage of students reporting having brought animals in each taxon (except tortoises and terrapins) (n = 84).

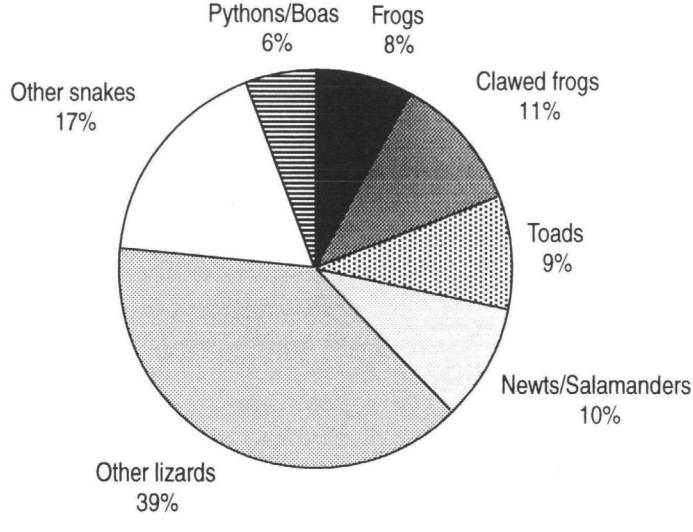

Figure 2b. Retail survey: percentage of animals of each taxon encountered (except tortoises and terrapins) (n = 1262).

died were among those taxa which had been predominantly, or entirely, caught by the students, namely frogs, toads, slow- worms and newts/salamanders, while the smallest proportion was among the entirely or almost-entirely bought species: the tortoises, terrapins, pythons and boas. One problem about interpreting these data is that those taxa with the lowest reported mortality were also those which included the species with the longest expected natural lifespans, making it difficult to draw conclusions about the welfare significance of relative mortalities between taxa. However, captive animals are generally not exposed to predators or harsh climatic conditions. Consequently, rates of annual mortality of wild populations, which, for example, are estimated to be about 50% for frogs and newts (Griffiths, 1996, personal communication[5]), should not be expected to occur in captivity. Indeed, some captive individuals have been known to live for remarkably long periods. Slow-worms have been recorded as surviving for as many as 54 years (Arnold & Burton, 1978) and common toads (*Bufo bufo*) have reached the remarkable age of 40 (Smith, 1973). The apparently high captive mortality for both these species indicated by the data recorded here (assuming the caught toads to be *Bufo bufo*, which is the only common indigenous species) needs to be examined more closely. Certainly, the data suggest that most taxa are, for one reason or another, not kept for very long. The exceptions are the tortoises and pythons/boas, two-thirds of both of which were reported to still have been in the student's possession after three years, and the terrapins, 37% of which remained after the same period. But even these proportions seem small. In fact, if the figures for these groups are removed from the data, then more than 92% of the individuals described across the remaining taxa are found to have died or been released, sold or given away by the end of 36 months. The period that these types of animals are being kept is a parameter which should be investigated. If such short periods are representative of the wider picture, then questions need to be asked as to why and how children's possession of herpetofauna ceases.

In this context, the similarity of the line graphs relating the period kept in captivity for the predominantly bought taxa and for the predominantly caught taxa is worth noting (Figures 3a and 3b). These slopes may reflect natural mortality rates, although the longevity of slow-worms and toads would seem to contradict this. It is more plausible that they describe a pattern of keeping companion animals among students whereby the levels of interest and/or commitment of many quickly wane. This period of a young person's life is a time of great change and many may simply become more interested in other things. Only a few individuals continued to maintain their companion animals for more than three years, and it is indicative that this is particularly true for those animals which have been bought. Not only

does the fact of their purchase point to a greater level of commitment on the part of their owners, but these species cannot easily be released back into their natural habitat.

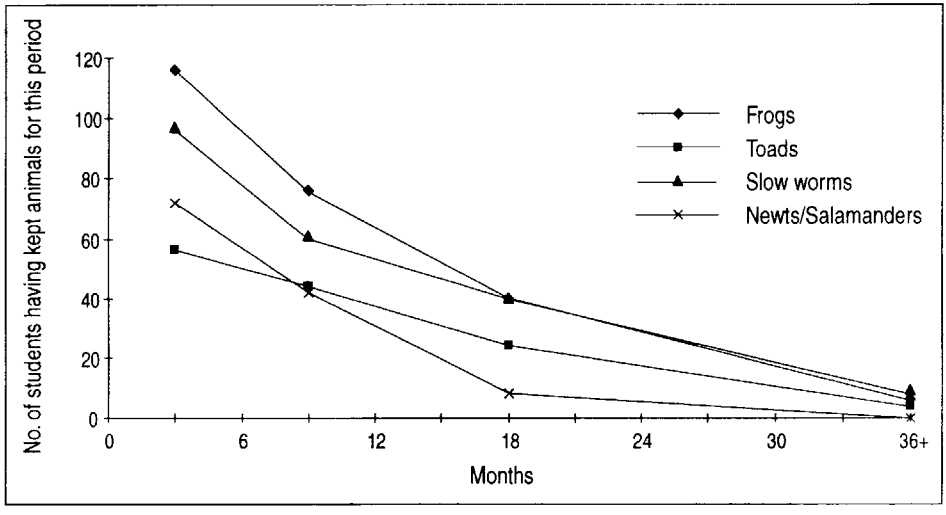

Figure 3a. Period kept: predominantly caught taxa.

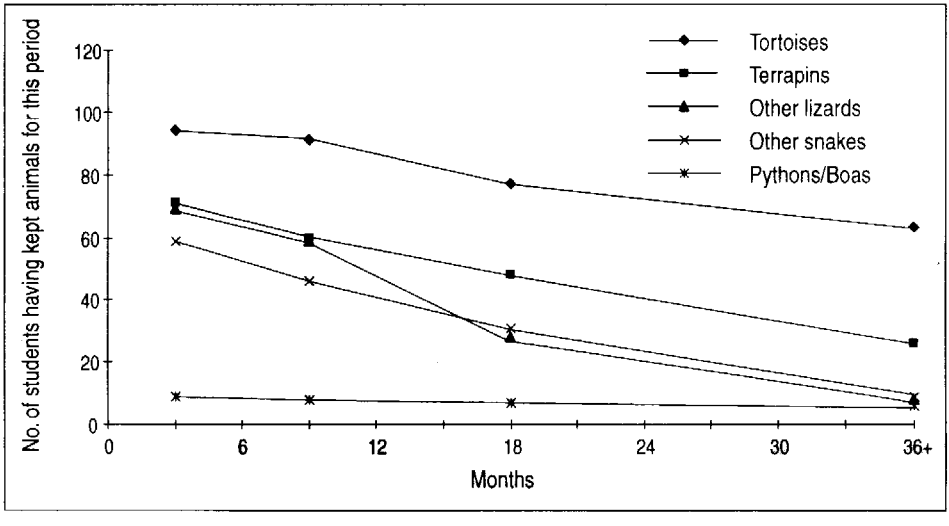

Figure 3b. Period kept: predominantly bought and other taxa.

When considered together, data on cause of death and period kept in captivity (Table 2), point to some areas of welfare concern. There were high numbers of escape-related deaths reported for several taxa. Overall, some 21% of all the animals reported upon were said to have met this fate, including nearly half of the frogs and 28% of the newts and slow-worms. It seems, therefore, that in many instances animals are not being furnished with suitably secure vivaria. In fact, the differences between the slopes of the line graphs recording the number of students who had each taxon for certain periods (Figures 3a and 3b) may be partially explained by the high escape-linked mortalities in certain taxa. This conclusion is further supported by the fact that the proportion of escape-related deaths tends to be lower for the predominantly bought taxa, which might be expected to have been provided with more secure accommodation.

The data for deaths linked to "other factors" include too many possible causes to allow interpretation, but those judged as "food-related" deaths seem to follow a pattern. The proportion of food-related deaths was lowest for those taxa with the highest proportions of bought animals, namely snakes, terrapins and tortoises. Only five individual animals meeting such a death were reported by the 233 students who had kept these taxa (2%). Getting purchased animals to feed does not therefore seem to have been a major problem associated with their care in captivity. However, this is not to suggest that adequate dietary provisions were provided, for it is widely recognized by established herpetofauna-keepers that supplying the correct food is probably the single most important problem they face. Just because an animal feeds does not mean it is being properly nourished. It might still perish as a result of malnutrition.

In considering the students' views about their own care-knowledge for each taxon, it is difficult to make more than a few general observations. There does seem to be a correspondence between some of those taxa for which a high proportion of students felt they knew enough about captive care and those taxa with low reported levels of mortality (tortoise, terrapin, python/boa). But this correspondence may have been precipitated by the fact that the care-knowledge question followed the one concerning mortality. Yet the substantial percentages of respondents who did not reply or who felt that they did not know enough about captive care of the largely indigenous types are worthy of note (newts 81%, frogs 60%, toads 47%, slow-worms 46%), while the same proportion for some bought taxa is also not insubstantial (tortoise 32%, terrapin 28%). Furthermore, it might be argued that these data underrepresent the true picture because students are unwilling to admit to a lack of knowledge.

Discussion and Recommendations

Despite the limited nature of the data, they suggest some interesting patterns and point to areas which would benefit from further action and research. The possible class and gender variations in the keeping of herpetofauna as companion animals seem to deserve closer examination, as might the means by which children's attitudes towards herpetofauna are formed and develop. These attitudes certainly need to be examined from the point of view of herpetological conservation. Along with many of our native flora and fauna, British reptile and amphibian populations have been declining over the past century (Prestt, Cooke, & Corbett, 1974; Arnold, 1995). This decline is said to be due to a lack of public understanding of the species' needs and inappropriate site management, as well as the more obvious process of habitat loss (Webb & Haskins, 1980; Swan & Oldham, 1993a, 1993b). The data relating to caught taxa from this survey, which were nearly all indigenous U.K. species, give particular cause for concern, for they seem to exemplify this lack of understanding. Not only do substantial (although not necessarily ecologically significant) numbers in certain taxa appear to be collected as companion animals (newts, frogs, toads, slow-worms, viviparous lizards, and grass snakes), but large proportions of some of them (notably frogs, toads and slow-worms – and possibly viviparous lizards, and grass snakes) seem to die quickly in captivity. Many of these deaths were related to inadequate care-provision, and in some cases, students' confidence in their own level of care-knowledge seemed low. Since students reported on just one individual of each taxon stipulated in the survey, the actual numbers of each species gathered by these students having met similar fates may have been much higher.

Whether or not wild populations are being adversely affected by collection, the students' limited knowledge and understanding of caught species as expressed through their poor care-provision does not encourage the view that they are capable of distinguishing appropriate conservation measures. This sort of understanding is considered vital to the success of conservation strategies (Wynne et al., 1995). It is not known whether those who have not kept herpetofauna as companion animals would fare any better, but it is reasonable to assume that those with experience of these animal types are more likely to be sympathetic to their cause. The general outlook for British reptile and amphibian conservation suggested by these survey data does not engender much optimism.

The welfare issues this study raises might best be addressed through schools, either by teachers themselves or by means of campaigns organized by appropriate animal welfare organizations. In addition, they could be explored in relation to

children's understandings of and attitudes towards animals. There is evidence, for instance, that many people do not recognize reptiles and amphibians as animals. In a study of 400 five- to eleven-year-olds, Martin and Nicholls (1993) found this figure to range between 10-40% for both frogs and snakes. Similarly, Tinkler (1993) recorded 60% of 150 adult zoo visitors as failing to classify a lizard as an animal. This may be due to a confusion of "mammal" with "animal." Bride (1996) recently found that of 228 respondents to a questionnaire about wildlife, at least 25% appeared to confuse the two. This view, that "animal" equals "mammal," is interesting because it gives a new perspective to what many people's interpretations of such concepts as "animal protection," "animal welfare," and "animal rights" might encompass. There are clear ramifications for herpetofauna welfare and a need for further research in this area.

The findings also suggest a need for more detailed data on reptiles and amphibians obtained from retail outlets. Although the proportion of mainly bought herpetofauna reported dead was generally somewhat lower than that of the predominantly caught taxa, the data still provide some cause for concern. For none of the mainly bought taxa is the percentage reported dead less than 20% (terrapin 31%, python/boa 22%, tortoise 21%). But if healthy, regularly feeding individuals of these taxa are purchased and kept under the correct conditions, most species are usually hardy and long-lived. These bought taxa data do not name particular species and cannot be controlled for natural mortality rates. However, a national survey of retail outlets by Smart and Bride (1993) has demonstrated that it is easy to purchase individuals of almost any species present in U.K. retail outlets (even delicate and/or very specialized species) without being asked or advised by the retailer about their subsequent care. Their survey of an estimated 16% of the U.K. outlets found a large number and variety of species and a possible welfare issue to be addressed in approximately half of the more than 500 vivaria inspected (70% of which were "lack of refuge" and 14% "inappropriate set up"). The combination of potentially stressful conditions for the animals at the point of purchase, inadequate instructions given to the buyer, and a non-specialist trade which involves a wide variety of taxa and which appears to be largely supply-led, is unlikely to encourage successful herpetofauna keeping among children. Although the evidence is circumstantial, it appears that there are significant welfare issues associated with many of the traded reptiles and amphibians kept as companion animals.

Conclusion

Reptiles and amphibians have been traditionally feared, and at least since Biblical times have suffered from "bad press." However, they arguably have great educational potential. In the field of biology they provide ideal vehicles for the study of many subject areas, including animal ecology, physiology, morphology, growth, reproduction, and bio-indicators. Given that populations of many indigenous species continue to decline (Prestt, Cooke & Corbett, 1974, Arnold, 1995) and their study and appreciation is recognized as an important and necessary component of their conservation (Wynne et al., 1995), this potential is also complemented by a need. Moreover, some species make excellent companion animals, are widely available as captive-bred specimens (which are generally disease free), and can be used to explore numerous issues in other subject areas, such as prejudice, perceptions of wildlife, pet-keeping and animal rights.

If the educational value of herpetofauna seems obvious, the opportunities to exploit it are many. Activities which would benefit both indigenous and traded species can be easily integrated into the national curriculum at many key stages. Yet the evidence from this survey points to undue suffering among these groups of animals. The animal welfare and rights debates do little to help the situation. They seldom refer to reptiles and amphibians, and many of those involved in these debates are themselves highly prejudiced in favor of feathers and fur, and are reluctant to move the discussion away from the safe arena of the attractive "fluffy and cuddly" creatures. The images of the animals they support are not very contentious and are often charged with positive emotions.

Although the picture revealed by this survey may be understandable in terms of how people value different animal types, it suggests a need for more detailed research. Perceptions of herpetofauna and patterns of herpetofauna pet-keeping should be explored further, while investigation of people's understanding of what is meant by "animal" and of patterns of pet-keeping in general would also prove valuable. Remarkably, the RSPCA themselves have yet to commission any study of patterns of pet-keeping among either young people or adults. But unless the questions raised in this paper are addressed, the apparent plight of herpetofauna kept by many young people is likely to persist, and other companion animal groups may be suffering in a similar way. Educational opportunities beckon, while practical and theoretical challenges invite and provoke. Reptiles and amphibians need all the friends they can get. Who will take up the challenge?

Appendix

Table 2

	No. of keepers	Period kept			Origin	
		>6mths	>1year	>3years	caught	bought
frog	116	76	40	6	102	14
toad	56	44	24	4	50	6
newt	70	42	8	0	67	3
salamander	3	0	0	0	1	2
slow worm	97	61	40	9	97	0
other lizard	69	59	28	8	43	26
python/boa	9	8	7	6	0	9
other snake	59	46	31	9	35	24
terrapin	71	60	48	26	0	71
tortoise	94	91	77	63	4	90
totals	644	487	303	131	399	245
%	100	76	47	20	62	38

Notes

1. Address all correspondence to Ian Bride, DICE, University of Kent, Canterbury CT2 7NX, U.K. The author would like to thank the RSPCA, who funded the overall research project; colleagues at DICE for comments, help and suggestions; Mr. Robin Dixon, who conducted the pilot survey; and the head teachers, teachers and pupils of the schools who so enthusiastically participated in the data collecting exercise.

2. Figure based on registered class numbers and does not account for absentees.

3. The county of Kent, England broadly retains the "Tripartite" system of secondary education for 11-18 year-olds wherein allocation follows an examination at the age of eleven (the "eleven plus"). The original idea (Board of Education, 1943) was that grammar schools (G) recruit the most academically inclined, technical high schools (T) concentrate on the applied sciences or arts, and the students at secondary modern schools (M) deal more with "concrete" things. In practice, the system has resulted in an overrepresentation of middle class students in grammar schools and working class students in secondary modern schools (Brooks, 1991).

4. A small handful of instances were encountered in which students had caught herpetofauna outside the U.K. (geckoes, snakes and tortoises), but such instances were unlikely to have been common enough to fundamentally contradict this deduction.

5. I am grateful to Dr. R. A. Griffiths, amphibian population ecologist, for this information.

Total Data – Aggregated for all Schools

Where dead – death linked with				View of own care knowledge*		
food	escape	other	not dead	knew enough	didn't know	no reply
10	54	18	34	32	16	37
7	11	15	23	26	7	16
4	20	3	43	11	13	34
0	0	2	1	2	0	0
10	26	17	44	45	13	25
9	7	5	48	23	20	21
1	0	1	7	7	0	0
1	11	9	38	23	10	15
1	2	19	49	44	3	14
2	10	8	74	47	3	9
45	141	97	361	260	85	181
7	22	15	56	49	16	34

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