

ON THE PRESENCE OF *RANA RIDIBUNDA RIDIBUNDA* PALLAS IN THE NETHERLANDS

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Since long there has been a dispute whether in the Netherlands there occur one or two species of green frogs of the genus *Rana*. There has never been any doubt concerning the presence of *Rana esculenta* Linnaeus, a species widely distributed throughout the country (Van de Bund, 1964, 1968). The first to mention *Rana ridibunda ridibunda* Pallas from the Netherlands were Van Kampen & Heimans (1927), who observed that they saw a specimen of *Rana esculenta* var. *ridibunda* from Den Horn in the province of Groningen. Unfortunately they did not state where the specimen was deposited and no such specimen could be found in the collections of the Rijksmuseum van Natuurlijke Historie (RMNH) in Leiden or in the Instituut voor Taxonomische Zoölogie in Amsterdam. Since that time there have been several additional records of the species. Van Wijk (1946, 1947, 1951) recorded the species from the provinces of Groningen, Zuid-Holland and Limburg. However, these data are not very reliable as they were based on field-observations by untrained people, mainly persons who keep reptiles and amphibians as pets. The material on which their observations were based was not available for examination, so the identifications could not be checked. Van Wijk (1947, 1951) also stated that he had received specimens from Groningen which he identified as *R. ridibunda*. As the characters he used to distinguish between the green frogs were correct, his identification probably was correct too. Unfortunately, also this material is not available for examination. The next author dealing with this problem is Van de Bund (1964), who gives more details concerning the localities of the specimens previously recorded by Van Wijk (1946, 1947, 1951): Groningen (Groningen, Haren, Eelde), Zuid-Holland (Sassenheim, Schiedam), Limburg (Meerssen). However, Van de Bund (1964) correctly regards these reports as too unreliable and concludes that the species should not be considered as belonging to the Dutch herpetofauna until more data are available. In a later paper (Van de Bund, 1968), he mentions the probability of this species occurring in the Netherlands only in a key, while in the text he does not consider the problem.

In recent years the problem of the *Rana esculenta-ridibunda-lessonae*

complex was studied intensively, starting with the work of Berger (1964, 1966, 1968, 1969, 1970) in Poland and that of Günther (1968, 1973) in the German Democratic Republic, followed by small scale projects in western Europe: Saarland (Halfmann & Müller, 1972), Switzerland (Blankenhorn et al., 1971; Heusser, 1972) and the Netherlands (Kodde, 1972). As a result of this work the characters in which the three species involved differ, including the morphological characters which could best be used to establish the identity of a specimen of green frog, became better known. The most useful character turned out to be the ratio length of tibia/length of inner metatarsal tubercle (LTib/LM). In combination with the ratio length of first toe/length of inner metatarsal tubercle (LToe/LM), this provides the means by which most specimens can be identified without problems. According to Günther (1973), the range of the first ratio for *lessonae* is 5-7, for *esculenta* 6.5-9.5 and for *ridibunda* 8.5-14. The range of the second ratio is for *lessonae* 1.46-1.92, for *esculenta* 1.88-2.67 and for *ridibunda* 2.70-3.52. It may be useful to add that the length of the first toe is measured from the distal end of the inner metatarsal tubercle to the tip of the toe, thus the tubercle is not included in this measurement. Other morphological characters that are useful in identifying frogs of this complex are the relative length of the tibia with respect to the snout-vent length (Günther, 1968) (in most specimens of *ridibunda* the tibiae are more than half the snout-vent length, in most specimens of *esculenta* they are shorter), and the snout-vent length (which is usually less than 6.5 cm in adult specimens of *lessonae*, for adults of *esculenta* less than 9 cm, whereas adults of *ridibunda* may attain 17 cm). Furthermore, there is a difference in colour, which is mainly manifest in the breeding season: males of *esculenta* and *lessonae* change their grass-green colour to bright yellow, males of *ridibunda* do not change their dark-brown or dark-green colour. Differences can also be found in the ecology and the ethology: specimens of *ridibunda* prefer large, open bodies of water like lakes and rivers; *lessonae* prefers small bodies of water with much vegetation, whereas the preference of *esculenta* is intermediate as it prefers ditches and small pools with quiet water and much vegetation. There are differences in the call and in the way of hibernation: *ridibunda* specimens hibernate in the mud on the bottom of the waters they inhabit, *lessonae* specimens hibernate on land and *esculenta* is again intermediate in this character, part of the specimens hibernating on land, another part in the water. Judging by the most recent studies on this problem (Günther, 1973), *Rana ridibunda* Pallas and *R. lessonae* Camerano should be considered semispecies and *R. esculenta* Linnaeus as a hybrid between the two that has become independant in certain areas. This became evident during hybridization experiments in which all nine

possible crosses were made and in which *esculenta* behaved like a hybrid, as it also does in ecology and in hibernation behaviour. Günther's conclusions are partly supported by those of Berger (1970), who in 1964 anew started the whole research on the subject. Accepting Berger's view that *R. esculenta* is the hybrid of *ridibunda* and *lessonae*, or the result of a cross between *lessonae* and *esculenta*, implies that nowhere *esculenta* can be found alone, as always there also have to be specimens of *lessonae*, while the presence of *ridibunda* is not necessary. However, from a map he published (1969), it is clear that *esculenta* only occurs in areas where *ridibunda* and *lessonae* are sympatric. Günther (1973) doubts part of Berger's conclusions on the base of his own results and because he found breeding, pure *esculenta* populations. This is not the place to pursue this matter further, but it will doubtlessly be clear that in western Europe still many aspects of the taxonomy, ecology ethology and also the histology of the green frogs of the *Rana esculenta-ridibunda-lessonae* complex will have to be studied before we can be certain which species occur(s) in that area.

A start has been made for the Netherlands by the study of Kodde (1972). This author mentions one specimen from the RMNH collections (reg. no. 10128), collected in Leiden on June 24, 1916, and donated to the museum by P. P. de Koning, one of the museum's technicians. For all characters examined this specimen falls within the range of *R. ridibunda ridibunda* Pallas and Kodde accepts this specimen as belonging to that species. However, in his conclusions he says: "De vraag of *Rana ridibunda* in Nederland voorkomt, moet dan ook nog onbeantwoord blijven." (The question whether *Rana ridibunda* occurs in the Netherlands, still remains to be answered). This very cautious statement may have been induced by the fact that only one specimen from the Netherlands was available. Recently I discovered among some unidentified material a frog that was sent to the RMNH through Mr. G. Bosch from Leeuwarden. The specimen (RMNH 17604) was collected by Mr. T. van Gijzen on July 21, 1963, in Surhuisterveen, in the eastern part of the province of Friesland. It is a large female with well developed oviducal eggs. On closer examination this specimen proved to be *Rana ridibunda ridibunda* Pallas. This identification was based on the large size (snout-vent length ± 115 mm, because of its contorted attitude this measurement cannot be made more precisely), on the ratio LTib/LM (for left and right side respectively 10.8 and 9.9), and on the ratio LToe/LM (for left and right side respectively 2.8 and 2.6). These values (except right LToe/LM) all fall completely outside the range of variation of *R. esculenta* Linnaeus, but inside that of *R. ridibunda ridibunda* Pallas. Therefore, we may conclude that *R. r. ridibunda* Pallas does belong to the Dutch herpetofauna. There is little to be

said about the distribution in the Netherlands, except that it is known from two widely separated localities, viz., Leiden and Surhuisterveen. Incidentally, the first locality (Den Horn) from which this species was recorded by Van Kampen & Heimans (1927) is only a few km east of Surhuisterveen and therefore the record most probably was correct. This seems to be the appropriate place to point out that further research in the north-eastern part of the Netherlands should be carried out, to be able to get a better picture of the situation in that (probably critical) region with regard to the green frogs of the *Rana esculenta-ridibunda-lessonae* complex. I have no notion of the situation in the remainder of the Netherlands, but research that is now being carried out on green frog populations near Nijmegen, by a team from the University of Nijmegen, may present us with more data on this problem.

It seems useful to give some measurements (in mm) of the two Dutch specimens of *R. r. ridibunda* Pallas:

	RMNH 10128	RMNH 17604
sex	♂	♀
snout-vent length	78.4	± 115
length of tibia	39.3-39.1	57.2-56.3
length of inner metatarsal tubercle	2.9- 3.3	5.3- 5.7
length of first toe	10.4-10.9	15.2-14.7

It is important to point out that both these specimens were collected before an irresponsible person thought it necessary to turn loose a large number of Bulgarian frogs of the species *R. r. ridibunda* Pallas in Rijsoord (province of Zuid-Holland), in an old riverbranch now completely cut off from the main river and named "t Waaltje". Therefore, we can neglect the possibility that these two specimens were released. It is not known what has become of the Bulgarian frogs in Rijsoord after this last winter. Though they were released on a very unfavourable moment (that is for their survival, not from the point of view of zoologists who try to minimize the contamination of the original fauna as much as possible), viz., on November 24, 1971, a few seem to have survived the not very severe winter of 1972/1973 (Kodde, 1972). Whether they did breed in 1972 and 1973 is not known, but it is to be hoped they did not.

SAMENVATTING

Lange tijd heeft er onzekerheid geheerst omtrent de vraag of *Rana r. ridibunda* Pallas nu wel of niet in Nederland voorkwam. In dit artikel worden twee groene kikkers gemeld, die zeker tot die soort behoren, één uit Leiden en een ander uit Surhuisterveen. Hiermee is de aanwezigheid van *Rana r. ridibunda* Pallas in Nederland bewezen. Over de verspreiding van de soort in ons land kan niets gezegd worden.

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Editorial note: see also Van Berge Henegouwen & Van der Velde, p. 16.