

**THE ANIMAL SOUND ARCHIVE AT THE  
HUMBOLDT-UNIVERSITY OF BERLIN:  
CURRENT ACTIVITIES IN CONSERVATION AND  
IMPROVING ACCESS FOR BIOACOUSTIC  
RESEARCH**

ZBIRKA ŽIVALSKIH GLASOV HUMBOLDTOVE  
UNIVERZE V BERLINU: SEDANJE DEJAVNOSTI ZA  
OHRANITEV POSNETKOV IN ZA IZBOLJŠANJE  
DOSTOPA ZA BIOAKUSTIČNE RAZISKAVE

KARL-HEINZ FROMMOLT, ROLF BARDELI, FRANK KURTH &  
MICHAEL CLAUSEN

## ABSTRACT

**The animal sound archive at the Humboldt-University of Berlin: Current activities in conservation and improving access for bioacoustic research**

The animal sound archive of the Humboldt-University is one of the oldest and largest collections of animal sounds. It was founded in 1951 by Günter Tembrock. Presently, the collection consists of about 120,000 bioacoustical recordings comprising almost all groups of animals. Most of the recordings are still on analogue magnetic tape. Currently, these tapes are transferred to digital storage media, mainly with 96 kHz sampling rate and 24 bit resolution. In this way, more than 50% of all recordings could already be preserved in digital form. The recordings will be documented by a database. Currently, an efficient system for the exchange of bioacoustical information, both metadata and soundfiles, for scientific purposes, is under development. The system consists of a central web-based database and local file storage servers. Free access to the metadata is available at "<http://www.tierstimmen.org>". Individual access to defined sound recordings will be controlled by password. The system should enable scientists to cooperate effectively in bioacoustic research.

*Key words:* Animal sound collection, bioacoustic database, bioacoustic website, Berlin.

## IZVLEČEK

**Zbirka živalskih glasov Humboldtove univerze v Berlinu: sedanje dejavnosti za ohranitev posnetkov in za izboljšanje dostopa za bioakustične raziskave**

Zvočni arhiv Humboldtove univerze v Berlinu je eden najstarejših in največjih arhivov živalskih glasov. Leta 1951 ga je osnoval Günter Tembrock. Zbirka trenutno obsega okoli 120.000 posnetkov skoraj vseh živalskih skupin. Večina posnetkov je še vedno shranjenih na analognih magnetnih trakovih, ki jih prenašajo na digitalne medije za shranjevanje, večinoma s frekvenco vzorčenja 96 kHz in 24 bitno globino. Na ta način je shranjenih že več kot polovica vseh posnetkov, ki bodo dokumentirani tudi v podatkovni zbirki. Na tej osnovi pa za namen raziskav razvijajo učinkovit sistem za izmenjavo bioakustičnih informacij, tako podatkovnih nizov kot tudi zvočnih datotek. Sistem sestavljajo osrednja spletna podatkovna zbirka in lokalni strežniki za shranjevanje datotek. Prosti dostop do podatkovnih nizov o shranjenih živalskih zvokih je dostopen na povezavi "<http://www.tierstimmen.org>". Dostop do posameznih zvočnih posnetkov pa bo nadzorovan z geslom. Sistem bo omogočal znanstvenikom aktivnejše sodelovanje pri bioakustičnih raziskavah.

*Ključne besede:* zbirka živalskih glasov, bioakustična zbirka podatkov, bioakustične spletne strani, Berlin.

*Addresses – Naslovi*

Karl-Heinz FROMMOLT  
Humboldt-University of Berlin  
Museum of Natural History  
Invalidenstr. 43  
D-10115 Berlin  
Germany

Frank KURTH  
University of Bonn  
Computer Science Dept. III  
Römerstr. 164  
D-53117 Bonn  
Germany

Rolf BARDELI  
University of Bonn  
Computer Science Dept. III  
Römerstr. 164  
D-53117 Bonn  
Germany

Michael CLAUSEN  
University of Bonn  
Computer Science Dept. III  
Römerstr. 164  
D-53117 Bonn  
Germany

## THE COLLECTION

The animal sound archive (German: *Tierstimmenarchiv*) is one of the oldest and largest collections of animal voices in the world. It was founded in 1951 by Günter Tembrock starting with a study of the vocal behaviour of red foxes. Later, recordings were made in the two zoological gardens of Berlin. From 1960 more and more animals were recorded in the wild. This was the basis of the series of discs *Voices of the Birds of Central Europe* edited by Günter Tembrock and Michael Schubert. The first disc was published in 1967 – *Birds of the Wood*. While up to 1990 the majority of the recordings was made by Günter Tembrock, his collaborators and students, now the collection is being expanded by external collections such as those of D. Langwald (recordings from the Tierpark Berlin), K. Conrads (a large bird sound collection) and G. Hohmann (recordings of primates from India and Sri Lanka). Since the scientific research at the animal sound archive is focussed on the acoustic communication of canids a large collection of Arctic fox vocalizations has been added.

Now the collection consists of around 120,000 recordings of animal voices. The collection comprises recordings of 1,800 species of birds, 580 species of mammals, more than 150 species of arthropods, some fish, amphibian and reptilian species and a large collection of human voices. One third of the animal recordings was made in the wild and two thirds in captivity. Wild animals were mainly recorded in Central and Eastern Europe, the Caucasus, Central Asia, especially Mongolia, some in Northern and Central America and Antarctica.

The sound archive is used primarily for scientific purposes. Lately, the recordings are more and more used for education, in zoological exhibitions at museums of natural history or at zoo schools, however. The 21st edition of the Brockhaus Encyclopaedia is illustrated by sounds from the animal sound archive.

## CONSERVATION OF THE RECORDINGS

With the majority of recordings still being on analogue magnetic tapes, conservation is a major topic at the animal sound archive. Fortunately, most of the tapes are still in very good condition. They are currently transferred to digital storage media. In order to retain high quality, digitalization is carried out at a sampling rate of 96 kHz and 24 bit resolution. Recordings from digital devices (DAT or HD-recorders) will be stored with their original resolution (e.g. 48 kHz/16 bit). Already, more than 50% of all analogue recordings could be preserved in digital form. The digitized recordings are stored on CDs or DVDs and in parallel on a large memory system at the computer and media services of the Humboldt-University. All information concerning the recordings is held in a database.

## ACCESS TO THE RECORDINGS

At present, we are developing an information system enabling cooperative research in the field of bioacoustics using the internet (BARDELI et al. 2005, CLAUSEN et al. 2005). The aim of this joint project is to create a web-based IT infrastructure located at the Humboldt-University of Berlin (Fig. 1).

Main aspects of the project are to establish a permanent web-based service and to develop a concept for cooperative data access. In the first project phase, bioacoustic data from the animal sound archive at the Humboldt-University was made available online. However, the development of mechanisms for including external bioacoustic data collections in a distributed fashion is a cornerstone of our concept.

Furthermore, the project aims at an integrated representation of various types of multimedia data available for a particular data set (bibliographic annotations, sound recordings, photographs, videos, etc.).

Another important goal of this project is to develop interfaces to allow for content-based search in the bioacoustic collections. Possible applications are manifold including the location of all recordings of a particular animal within the collection or finding all animal sounds which are similar to a given query sound.

Main features of the information system include:

- Web-based cooperative access to metadata and audio files
- Online extensibility by external audio- and metadata
- Connection of external databases, allowing distributed data storage
- Online searching and browsing of metadata
- Interface for content-based search algorithms
- User rights controlling access to data and administrative functions
- Quality control of submitted data
- Online signal processing, visualization and annotation

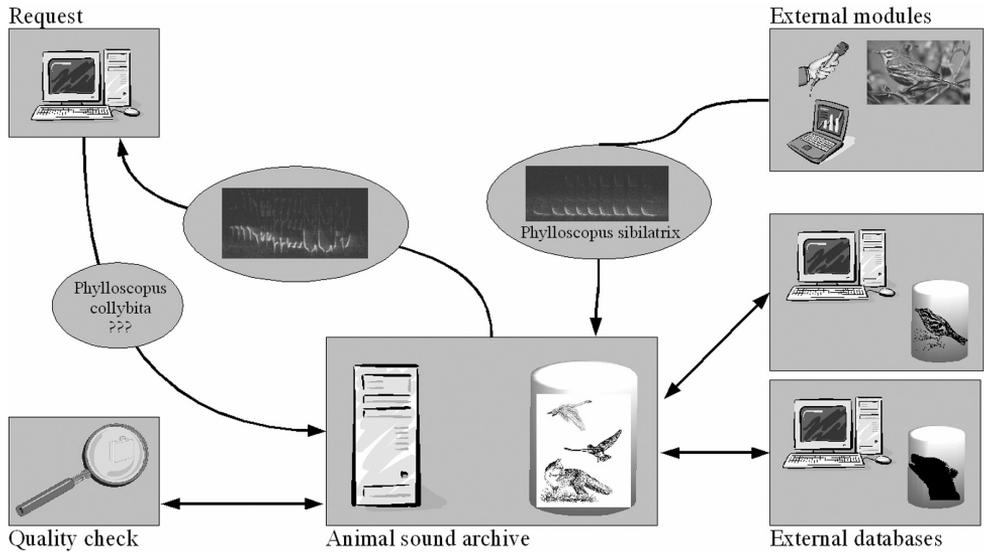
Free access to the metadata is already available at <http://www.tierstimmen.org>. Searching the metadata is also possible using the GBIF portal (<http://www.gbif.org>). Individual access to defined sound recordings will be controlled by password. The system should enable scientists to cooperate effectively in bioacoustic research.

## ACKNOWLEDGEMENTS

The project creating a web-based IT infrastructure located at the Humboldt-University is funded by the Deutsche Forschungsgemeinschaft (DFG).

## REFERENCES

- BARDELI, R., CLAUSEN, M., FROMMOLT, K.-H. & KURTH, F., 2005: "Ein verteiltes Informationssystem zur Forschungskooperation in der Bioakustik".- *Fortschritte der Akustik. DAGA*, 05, 493-494.
- CLAUSEN, M., BARDELI, R., KURTH, F. & FROMMOLT, K.-H., 2005: Informations-Infrastrukturen für netzbasierte Forschungskooperation in der Bioakustik.- *Naturschutz und Biologische Vielfalt Heft 16, Bioakustische Mustererkennung. B. f. Naturschutz, Bonn*, 49-58.



**Figure 1:** Schematic overview of a web-based information systems enabling online cooperative research in the field of bioacoustics.