

**CORMORANTS' THE WEBSITE OF THE WETLANDS INTERNATIONAL  
CORMORANT RESEARCH GROUP TO PROMOTE THE KNOWLEDGE OF THE  
ECOLOGY AND LIFE HISTORY OF PHALACROCORACIDAE**

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**Introduction**

In December 2002, the *Cormorants* website will be two years old. The first idea of a website dedicated to the "cormorants' world" was born in the summer 2000. At that time I was looking for updated information on cormorant conflicts and examples on how it is possible to reduce cormorant damage at aquaculture facilities. I spent pretty much time browsing the web where I found hundreds of pages dealing with every kind of cormorant stuff. Many of them were somehow interesting and helpful, but the great majority was totally useless, being unspecific or empty of any content. Some others, quite unexpectedly, were only marginally related to *Phalacrocorax* birds referring instead to other subjects such as, for example, search and rescue helicopters, music and press houses, white wine and food brands, restaurants specialised on fish, diving and holidays resorts, telecom systems and even menopause ... Thus, the *Cormorants* website was first conceived as a personal reference area where collect useful information and documents gathered from Internet. However, working on the site construction, I realised that a website might have been much more, i.e. the ideal tool to exploit the unnumbered potentiality offered by Internet for hosting information and data, quickly informing and keeping in touch the diverse and cosmopolitan community of people interested in cormorants and related topics.

Having this in mind and following some excellent examples (e.g. the Shrew (ist's) Site, the Mammal Society and the Seaduck websites), I started to work on the *Cormorants* website whose original main goals were:

- 1) to make available a virtually unlimited and easy to update database on all kind of resources related to cormorants, such as: bibliographic references, low circulation documents and grey literature, study methods and data, research projects, meeting announcements and proceedings, pictures and movies, etc.;
- 2) to be a point of reference for professional ornithologists and birdwatchers, students and teachers, fish-managers and any other person somehow interested in cormorants' biology and ecology.

A "working in progress" version of *Cormorants* was first presented at the 2nd Meeting of the WI Cormorant Research Group, held in Freising (Germany) in December 2000. There, the website has been recognised as a powerful tool to accomplish the mission of the Group, enlarge its auditory, promote its activities, encourage collaboration and quick interactions among members. Thus, *Cormorants* was adopted as the official website of the Group.

**Site organisation**

The *Cormorants* website wants, first of all, to be informative and easy to navigate through. Thus, contents are regularly updated and arranged to facilitate browsing, information

retrieving and data downloading. From a graphical point of view the structure is rather unsophisticated, but maintained as simple and constant as possible in the different sections. Automatic pop-up, dynamic events and other special effects are almost absent, and used only when they results functional to the content presentation.

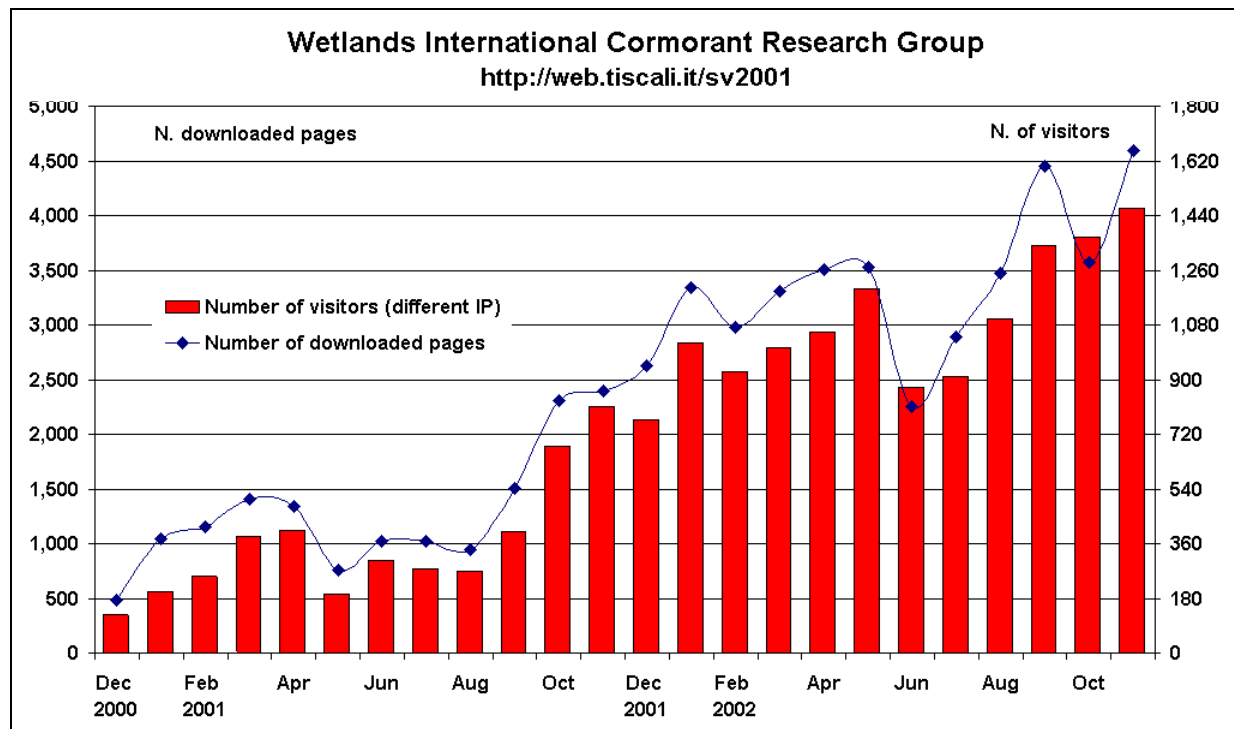
At present, the website consist of 220 html files, 40 pdf documents and about 400 pictures (gif and jpg imagines) for a total of 16.8 Mbyte. Website contents is organised in ten sections (e.g. the Cormorant Group and its Bulletin, the colour-ringing projects, literature citations, a directory of cormorant people, species accounts, etc.) each incorporating sub-sections (e.g. taxonomy and classification) or direct links to single pages (e.g. vocalisations, papers published in the Bulletin). A link in the homepage allows the surfer to join the cormorant e-list and send automatic messages to all the list members.

### **Some statistics**

Since the publication on the world web wide, several website statistics have been recorded. This has allowed to keep constantly monitored the number and frequency of website access, the most visited pages, the geographical origin of visitors, the referring URLs and search engines. Overall, in the 24 months period from December 2002 to November 2002, *Cormorants* has been accessed by 17,329 visitors who have viewed more than 56,000 pages (the latter figure is a minimum estimate because only a small number of the pages available in the site are monitored). In the last 3 months period, daily access averaged 47 (DS 2.1) visitors and 142 (DS 16) visited pages.

Most visited sections were respectively those on scientific literature (24% of the overall contacts), which includes all papers published in this Bulletin and meeting proceedings, and on colour-ringing (22.1%), which list all known projects in and outside Europe. The most visited single pages was, rather surprisingly, that on the now extinct Spectacled cormorant (*P. perspicillatus*) (6.2%) followed by those reporting techniques for diet assessment and egg-shell thickness measurements, food intake and prey selection, population estimates (about 2% each).

In the two years period, either the numbers of visitors and viewed pages have steadily risen showing a similar trend and a regular monthly pattern along the year (Fig. 1). Website numbers showed the tendency to increase from autumn to early spring, then to decrease or remain stable during the summer. Curiously, this pattern seems to follow the cormorant annual cycle and the seasonal changes of distribution and intensity of cormorant-human conflicts. Website high numbers correspond to migratory movements and the early wintering phase (when cormorants disperse over their range and become easier to be seen), while low numbers were recorded during late spring and summer, i.e. the nesting period, when cormorants concentrated in the close range of the breeding colonies. This is, however, also the period people spend more time in the field than connected to Internet or they are on holidays...

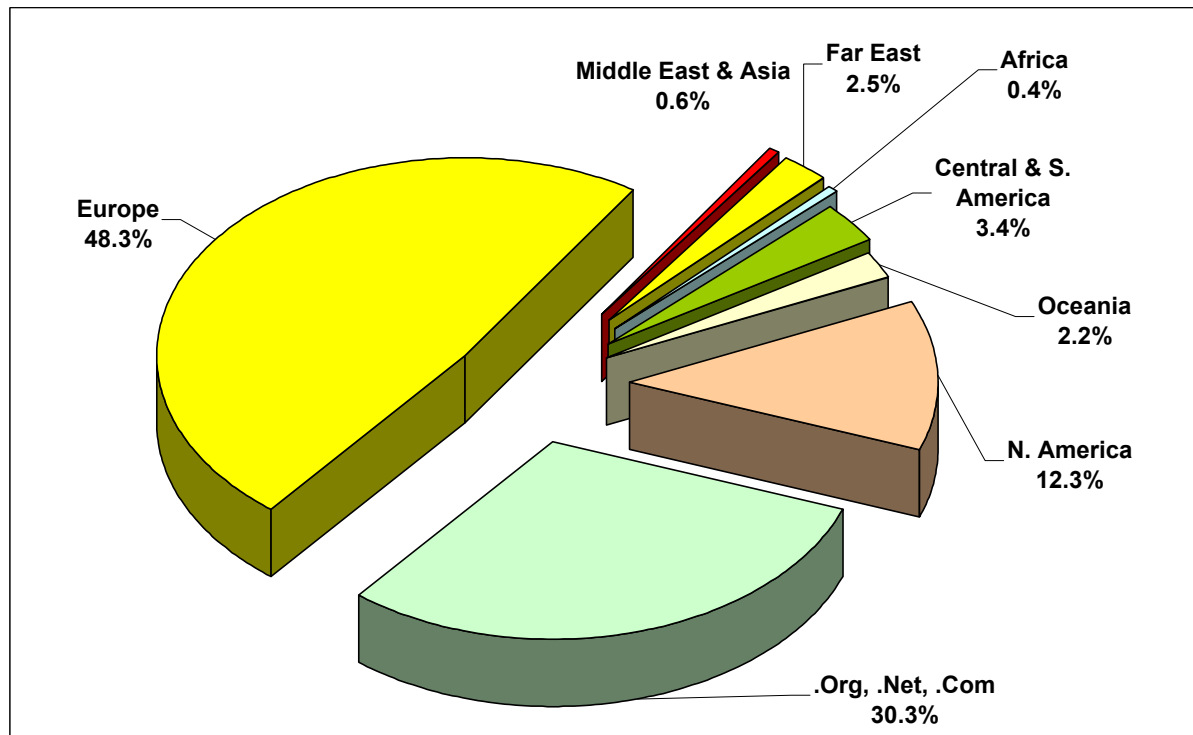


**Figure 1.** Trend of the number of visited pages and visitors recorded in the period December 2000 to November 2002.

According to their Internet Service Provider, *Cormorants* visitors originated from at least 82 countries distributed all over the continents (Fig. 2). Visits were recorded from the whole North America and Europe, 11 countries in Central and South America, six in Africa and Middle-East, 17 in Asia and far-East. Frequency and intensity of visitors from different countries seem to reflect the content composition of the site and the interest inside the Research Group (which are still skewed towards *P. auritus* and the three European species), as well as the geographical distribution of people involved in cormorant studies or conflicts (Table 1). Unknown, but certainly not negligible, is also the effect of computer distribution and availability of Internet connections.

### How visitor get on the site

World wide access to *Cormorants* has been greatly facilitated by the subscription to the most important Internet directories and search engines (e.g. Google, MSN Search, Searchlot, Yahoo!), and by the growing number of links provided by governmental agencies (e.g. U.S. Fish & Wildlife Service), environmental NGOs (Centro Italiano Studi Ornitologici; Ligue Protection Oiseaux Anjou; Schweizerischer Fischerei-Verband; Wetlands International), birdwatching and ornithological societies (Aves Société Ornithologique; Dirk Raes colour-ringing birding; Grupo Ibérico Anillamiento, Staatlichen Vogelschutzwarte Hamburg) and even personal homepages. Search engines and referring URLs work in a complementary way to attract people attention and improve public awareness of the Research Group and its activities. Typing keywords such as "cormorant(s)" and "Wetlands International", alone or even better in combination with "research group", "colour-ringing" or "scientific literature", shows the *Cormorants* in the first rank positions and provides direct links to the homepage or one of the website sections.



**Figure 2.** Percentage of visited pages per origin of the Internet Service Providers (N = 42,781)

### Who are the visitors

Such a large range of potential access to the website means that it is difficult to answer what exactly is the *Cormorants* audience and what visitors are looking for. However, some information can be inferred analysing the keywords submitted to the search engines, the list of referring URLs, the rank of most visited pages, the daily visitor averages and, finally, the requests for information forwarded to the webmaster.

The outcome of this analysis was indeed quite vague but likely very close to the reality. Thus, the website is more visited on working days than in the weekend (average 16.2% vs. 7.9%) by a wide range of people which encompass academic and professional ecologists, bird-ringers and birdwatchers, anglers and fish-farmers, producers of bird-nets and audio-visual deterrents, film makers, students from primary school to post-doctoral courses and, last but not least, general public. Many of them are frequent visitors which regularly browse the website looking for specific information and data, or just to find answers to only apparently naive questions, such as: "how much fish a cormorant eats every day", "what cormorant species live in the Catalina area", or "why they spend so much time spreading their wings"...

**Table 1** Country of visitor origin ranked according to the number of viewed pages recorded from December 2000 to November 2002 (N = 42,781). Only countries accounting at least 1% of the total number of viewed pages were reported. Internet Service Providers from an unknown geographic origin (e.g. .Org, .Net, .Com) were not considered.

Rank	Country	N. visited pages	% visited pages
1	United Kingdom	3,897	9.1
2	USA	3,416	8.0
3	Italy	2,867	6.7
4	France	2,641	6.2
5	Spain	2,064	4.8
6	Canada	1,827	4.3
7	Netherlands	1,414	3.3
8	Belgium	1,077	2.5
9	Brasil	1,013	2.4
10	Germany	983	2.3
11	Japan	845	2.0
12	Australia	686	1.6
13	Estonia	672	1.6
14	Poland	630	1.5
15	Denmark	616	1.4
16	Switzerland	572	1.3
17	Greece	453	1.1

## **Conclusion**

In the very last years, Internet has shown a dramatic development. Thanks to its world wide diffusion, faster and cheaper connections, Internet has created new and not yet completely exploited opportunities for communication and knowledge sharing among people.

Following this new era, *Cormorants* has accomplished the Research Group mission providing easy and free access to documents and updated information as well as allowing fast interaction among cormorants' people.

This has risen new opportunities to the Research Group, which may not only serve for expertise "on demand", but also promote research and projects taking advantage of co-operation among a large number of widely distributed members. Some examples of the role the website may play (advertisement, form distribution, diffusion of results, etc.) are the ongoing projects on the distribution of *P. carbo* and *P. pygmeus* colonies in Europe, and the first international census of Great cormorants wintering in Europe and North Africa scheduled for January 2003.

The new Group activities and the positive feedback received from many people certainly represent a stimulus to improve and further develop the *Cormorants* website.

**Acknowledgement.**

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<sup>1</sup> The Internet address of *Cormorants* is: <http://web.tiscali.it/sv2001>

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