Figure S1

2008/139/12  Botaurus stellaris
2008/221/25  Cygnus olor
2008/122/106  Lagopus lagopus
2008/45/2  Sterna sandvicensis
Figure 1
Figure 2
Figure 3

Protoporphyrin IX $\log_{10}(1 + \text{nmol g}^{-1})$

Biliverdin $\log_{10}(1 + \text{nmol g}^{-1})$
Figure 4

Biliverdin

Alca torda
Uria aalge
Cepphus grylle
Fratercula arctica
Catharacta skua
Larus ridibundus
Rissa tridactyla
Sterna sandvicensis
Numenius arquata
Tringa totanus
Vanellus vanellus
Haematopus ostralegus
Burhinus oedicnemus
Columba oenas
Platalea leucorodia
Ardea cinerea
Gavia arctica
Ciconia ciconia
Fulmarus glacialis
Caprimulgus europaeus
Otis tarda
Botaurus stellaris
Phalacrocorax carbo
Halaeetus albicilla
Milvus milvus
Buteo buteo
Accipiter nisus
Circus aeruginosus
Pandion haliaetus
Podiceps cristatus
Aythya apus
Falco peregrinus
Upupa epops
Gallicula chloropus
Streptopus aluco
Alcedo atthis
Merops apiaster
Picus viridis
Bucephala clangula
Somateria mollissima
Aythya fuligula
Anas platyrhynchos
Cygnus olor
Anser anser
Oxyura jamaicensis
Lagopus lagopus
Perdix perdix
Coturnix coturnix
Alectoris rufa

Protoporphyrin

0 1.85

0.13 2.68
**Figure legends**

**Figure S1.** Eggshell fragments (> 1cm$^2$) were cut from the equatorial region of the whole shell. Digital photographs were taken of each sample and a binary mask was constructed to locate the eggshell sample in the photograph for all subsequent colorimetric analyses.

**Figure 1.** The CIELUV chromaticity space occupied by the average of the three principal colours for each of the 49 species’ eggs ($n = 3$ eggs per species) is provided in the top central panel. In the bottom two panels, the three principal colours for a single different egg from each species, are joined by straight (nearest distance) lines, with the size of the points denoting the proportion of pixel coverage each colour contributes. In the bottom right panel, only the twelve eggs pictured are presented. The species are: (a) *Haliaeetus albicilla*, (b) *Circus aeruginosus*, (c) *Ardea cinerea*, (d) *Alcedo atthis*, (e) *Merops apiaster*, (f) *Larus ridibundus*; (1) *Picus viridis*, (2) *Alectoris rufa*, (3) *Botaurus stellaris*, (4) *Falco peregrinus*, (5) *Alca torda*, (6) *Tringa totanus*. Note that the immaculate eggs (e.g., a, c, d) share very similar colours compared with the maculated eggs (e.g., f, 5, 6). Lightness (or saturation) is not represented in this figure.

**Figure 2.** Bivariate scatterplot of the positive association between pigment concentrations standardized by fragment sample surface area (mm$^{-2}$) and fragment sample weight (g$^{-1}$) for protoporphyrin IX (red loci) and biliverdin (blue loci). Hollow loci indicate values for individual fragments (3 per species). Lines of best fit were estimated by ordinary least squares regression and are fitted through the 49 species means (solid loci).
**Figure 3.** Bivariate scatterplot of the interspecific relationship between the average concentration \( \log_{10}(1 + \text{nmol g}^{-1}) \) of the eggshell pigments protoporphyrin IX and biliverdin. Maculated (patterned) species (solid loci) and immaculate species (hollow loci) are distinguished. The shaded (grey) region of the graph indicates values less than one nmol g\(^{-1}\). The line of best fit is estimated by ordinary least squares regression (Pearson’s correlation \( r = 0.803, n = 49, P < 0.001 \)). Species with high residuals across the relationship (chosen non-randomly) are depicted for both protoporphyrin IX (1-6) and biliverdin (a-f). In all cases the photographs (taken by GM) are of an actual egg used in subsequent analyses prior to the removal of a shell fragment. The species are: (1) *Picus viridis*, (2) *Alectoris rufa*, (3) *Botaurus stellaris*, (4) *Falco peregrinus*, (5) *Alca torda*, (6) *Tringa totanus*; (a) *Haliaeetus albicilla*, (b) *Circus aeruginosus*, (c) *Ardea cinerea*, (d) *Alcedo atthis*, (e) *Merops apiaster*, (f) *Larus ridibundus*.

**Figure 4.** Maximum likelihood consensus phylogenetic tree for 49 species used in the comparative analysis of the association between species biology and eggshell pigment concentration. The coloured branches depict the concentration (log10) of the two pigments protoporphyrin IX and biliverdin. Species names with maculated (patterned) shells are labelled in **bold**. The phylogenetic correlation between the two pigments is positive and highly significant (see Results).
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