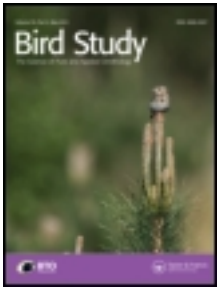

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Short Notes

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ORBITAL RING COLOURS OF HERRING GULLS IN BRITAIN

IN THE CANADIAN ARCTIC, Smith (1966) found that orbital ring colour helped to isolate Herring Gulls *Larus argentatus* (with 'orange' rings) from Thayer's Gull *L. thayeri* and Kumlein's Gull *L. glaucoides kumlieni* (both of which have 'purple' rings). Brown (1967) and Harris (1970), working on Herring Gulls and Lesser Black-backed Gulls *L. fuscus* in northern England and Wales respectively, considered that orbital ring colour might play a short-range role in isolating them. Yet the Glaucous-winged Gull *L. glaucescens* (with 'purple' orbital rings) and the Western Gull *L. occidentalis* (with 'orange' rings) hybridise extensively in a small overlap zone along the Pacific coast of North America (Hoffman *et al.* 1978). These studies suggest that orbital ring colour can act as a species isolator, but not invariably.

Witherby *et al.* (1944) record the colour of orbital rings of adult Herring Gulls as 'orange'; others have recorded them as yellow. Dwight (1925) referred to adult *L. a. smithsonianus* as most frequently having 'vermilion eyelids' in summer, although he had occasionally seen breeding birds with 'yellow eyelids'. Vermilion is the description commonly assigned to orbital rings of British Lesser Black-backed and Great Black-backed Gulls *L. marinus* (Witherby *et al.* 1944). The present account refers to the same colour in British Herring Gulls, and gives evidence that there are two orbital ring colours in the Herring Gull and its close relatives, which vary in saturation. The literature descriptions 'orange' and 'vermilion' probably refer to the rich ends of two saturation ranges; yellow and pink refer to weaker tones of the same hues. These two ranges are distinct, are geographically widespread in the soft parts of large gulls, and are considered to be due to two pigments. My own records also show a variation in the width of the annulus so coloured; adults in prime breeding condition, with very white heads, have well developed ring pigmentation. Variation is found between seasons and between individuals at any one date. The data and discussion that follow concentrate on birds at colonies during the breeding season, and the orbital ring colours will be referred to as yellow and purple for the sake of simplicity. These colours are not found mixed, except rarely in hybrid intergrades (e.g. Hoffman *et al.* 1978); many such intergrades have pale, even white, rings.

A collation of orbital-ring colours of adult Herring Gulls in the breeding season at scattered localities in Britain (Table I) shows that both pigments are widely distributed. On Islay the author examined about a quarter of the Herring Gull population, and substantial proportions were also examined on the islands of May, Walney, Skomer and Skokholm by others. At none of these, or the other locations listed in Table I, were yellow and purple ringed Herring Gulls found breeding or assembling at the same colony.

Most purple orbital-ringed Herring Gulls were found nesting in cliff colonies whereas those studied on flatter ground, where hides and normal sampling techniques were applicable, had yellow orbital-rings. There are also yellow records from the cliffs of Kent, Skomer, Skokholm and St Kilda. Both purple and yellow ringed Herring Gulls share some breeding sites with Lesser Black-backed Gulls (Table I). This association is closer in the former case, on rocky cliffs as on Islay. Where yellow ringed birds are concerned, as on Walney and Skokholm, there is a tendency for segregation, the Herring Gulls nesting mainly on low eminences or cliffs whilst the Lesser Black-backed Gulls nest on flatter ground. Thus habitat differentiation occurs between the yellow ringed and the purple ringed birds whether the latter are light backed or dark backed, and is apparently absent

TABLE I. ORBITAL-RING COLOURS OF HERRING GULLS AT SOME BRITISH LOCALITIES (Y = YELLOW, P = PURPLE)

Locality	*Year*	*No. checked*	*Colour*	*Habitat*	*Observer*
Shetland	1980	20	Y	Flat, grassy (LBBG)	PM
St Kilda: Boreray	1980	60	Y	Rocky cliffs (LBBG)	ND
Strathclyde:					
Rhinns, Islay	1979	6	P	Rocky cliffs (LBBG)	REE
Sanaigmore, Islay	1979	7	P	Rocky cliffs (LBBG)	REE
Gartbreck, Islay	1979	100	P	Dump	REE
Islay	1979–1980	53	P	Various feeding sites	REE
Tarbert, Kintyre	1979	12	P		REE
West Kintyre	1974–1975	30	Y	Moorland & low rocky coast	ND
Fife: Isle of May	1974–1980	5000+	Y	99% on level rocky ground (LBBG)	ND
Dumfries & Galloway:					
Mull of Galloway	1980	6	P	Rocky cliffs	REE
Meikle Ross	1980	14	P	Rocky cliffs (LBBG)	REE
Balcary Point	1980	19	P	Rocky cliffs	REE
Portwarren	1980	15	P	Rocky cliffs	REE
Cumbria: Walney Island	1962–1965	large	Y	Sand dunes & gravel workings (LBBG)	Brown 1967
Lancashire: Abbeystead	1974–1976	600	Y	Moorland (LBBG)	ND
Humberside:					
Bempton to Flamborough	1980	66	P	Rocky cliffs	REE
Anglesey:					
South Stack	1980	14	P	Rocky cliffs	REE
Penmon Point	1980	40	P	Old quarry near sea (LBBG)	REE
Dyfed: Skokholm & Skomer	1962–1966	large	Y	Rocky cliffs and flatter ground (LBBG)	Harris 1970
Somerset: Steep Holm	1974–1977	165	Y	90% on vegetated slopes and plateau (LBBG)	GPM
Cornwall:					
Lands End peninsula	1980	300	Y	Moors, mine tips, buildings	PHS
Lizard peninsula	1980	150	Y	Moors	PHS
Kent: North Foreland	1980	3	Y	Cliffs	SW
South Foreland	1980	19	Y	Cliffs	SW

NOTES. Habitat: where these are colonies which also contained Lesser Black-backed Gulls, this is indicated (LBBG).
Observer: ND = N. Duncan; PM =Dr P. Monaghan; GPM = G. P. Mudge; PHS = P. H. Speed; SW = S. Warren; REE = author.

where both are purple ringed. Additionally, Brown (1967) thought that call note tones helped to isolate yellow ringed Herring Gulls from Lesser Black-backed Gulls, and a marked difference is also apparent on Islay.

The author suggests that the yellow ringed Herring Gull tends to be isolated from the purple ringed Herring Gull by orbital-ring colour and habitat choice, whilst the latter is isolated from the Lesser Black-backed Gull primarily by mantle colours and call note tones. All four factors probably operate between the yellow ringed Herring Gull and the Lesser Black-backed Gull but, as Brown (1967) remarked, the habitat factor probably plays a minor role.

I thank those who supplied data (listed at the foot of Table I) or commented on the drafts of this account, espcially Dr M. P. Harris who made many helpful suggestions.

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COMMON GULL PREDATION OF WINTER MOTH LARVAE

WHILE ON THE MOORLANDS of Mainland (Orkney) in early June 1980, I noticed that patches of heather *Calluna vulgaris* ranging in size from 1 to 20+ ha were fox-brown in colour, largely due to severe defoliation by caterpillars of the Winter Moth *Operophtera brumata*. Larvae of the Dotted Border *Agriopis marginaria* were also found, but these were less abundant and more local in their distribution. The mature and rank stages of heather, which would have given good cover to the flightless females of both species when laying their eggs, were particularly affected and it was my impression that the worst affected areas were often more sheltered than the surrounding moorland. I estimated the numbers of larvae on 11 and 17 June by walking in a straight line through two areas 20 km apart and throwing a 25 cm^2 quadrat every 5 m for 50 m. The numbers of Winter Moth and Dotted Border larvae in the two areas were (1) 1,184 and 144/m^2, and (2) 1,552 and 16/m^2; these were under-estimates as some larvae were lost when I shook them off the plants into my collecting bags and because some ate others in the bags. The larvae were therefore very abundant and, as they fed near the top of the plants, were readily available to predators.

In addition to passerines such as Starlings *Sturnus vulgaris* and Meadow Pipits *Anthus pratensis*, flocks of up to 400 Common Gulls *Larus canus* (with occasional Herring *L. argentatus*, Lesser Black-backed *L. fuscus* and Black-headed Gulls *L. ridibundus*) fed on these larvae. The gulls fed by balancing on the heather plants, often fluttering to do so, and walking slowly into the wind, pecking rapidly as they went. The whole flock was constantly moving, with individuals flying on a few metres between short bouts of feeding. Pecking rates averaged one per second. On at least three moors, most of the adult Common Gulls from nearby colonies were seen feeding in this way in the morning and late afternoon/evening. Although the Winter Moth larvae were small (up to 1 cm) and composed mainly of water, their abundance and availability close to gull colonies must have been an attractive source of food as the gulls ate great numbers of them.

By late June, the surviving larvae had pupated in the litter. Most heather shoots in the affected areas were severely defoliated and some plants killed. It was also noticeable that the heather shoots in these areas had been purple/brown rather than the bright green normally assumed in summer. Common Gulls are well known to feed on insects on heather moorlands (Vernon 1972), which they do mainly by hovering and picking them off the plants. Lorimer (1975) has found that they are important predators of the cocoons of the Ruby Tiger *Phragmatobia fuliginosa* on the Orkney moorlands in spring, and Kettlewell (1973) considered their predation to be a major factor for selection in favour of the more cryptic melanic morphs of the Autumnal Rustic *Paradiarsia glareosa* in Shetland and the Oak Eggar *Lasiocampa quercus* in Caithness. The incident I have described above is unusual, (a) because of the abnormal number of Winter Moth larvae on the Orkney Mainland moors in 1980, and (b) for the opportunist manner in which the gulls preyed upon them and the large number they must have eaten.

It is a pleasure to acknowledge the helpful comments of Dr. D. Jenkins and of R. I. Lorimer, who further assisted with identification of the larvae and provided details of the annual cycle of the Winter Moth.

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