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Varied Thrushes Feeding on Talitrid Amphipods

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At about 0700 on 28 June 1977, while camped near Norwegian Memorial along the Olympic National Park ocean-beach wilderness strip in Clallam County, Washington, I observed two Varied Thrushes (*Ixoreus naevius*) feeding actively above high tide line on an open sandy beach. At this location a dense old-growth coastal coniferous forest halts abruptly at the margins of the beach, and the thrushes ventured only as far as about 15 m seaward of the forest edge. The two birds were observed pursuing, capturing, and consuming a large number of "sand-hoppers," amphipods of the family Talitridae (Class: Crustacea), which were abundant on the beach at the time. After feeding for about 10 min on the amphipods, the thrushes flew back into the woods and did not reappear on the beach.

The great majority of the amphipods present on the beach during the observation period were *Orchestoidea californiana,* a numerous and widely distributed form on the Pacific Coast of North America (Kozloff 1973). Several other amphipods, though they are as yet imperfectly catalogued (Kozloff 1973, 1974), are known to occur on Washington coastal beaches, however, and some other species such as *Orchestia traskiana,* may also have been taken by the thrushes.

The Varied Thrush, a bird primarily of the dense, humid forests of western North America from California to Alaska (Bent 1949, Jewett et al. 1953), has not previously been recorded to forage on open beaches and is not mentioned in the literature as being a predator on amphipods. However, these behaviors are not out of keeping with the species' more common feeding activities. Varied Thrushes are widely mentioned as ground foragers in forests (Jewett et al. 1953), on suburban lawns (Dawson 1923), and in agricultural fields (Beal 1915). A variety of food sources has been documented for Varied Thrushes: insects of the orders Homoptera (McAtee 1906), Hymenoptera, Hemiptera, Diptera, Lepidoptera, Orthoptera, and Coleoptera; Arachnids; Diplopods; terrestrial isopod Crustaceans; oligochaete Annelids; gastropod Molluscans (Beal 1915); and a sizeable number of fruits, seeds, and other plant materials (Grinnell 1898, 1900; Beal 1915; Hoffman 1927; Adams 1947). Moreover, Varied Thrushes are known to breed to the outer edges of the coastal forests (Bent 1949), and pairs of birds nesting close to the beach, given their catholic taste in prey organisms, would be expected to exploit readily so abundant a food source as amphipods provide in some coastal locations.

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Age Differences in Ring-billed Gull Kleptoparasitism on Starlings

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Kleptoparasitism is well known among gulls, terns, and skuas (Trillmich 1978, Grant 1971). Intraspecific parasitism has been reported for Common Terns (*Sterna hirundo*, Hays 1970) and Ring-billed Gulls (*Larus delawarensis*, Elston et al. 1977). Interspecific kleptoparasitism has been reported for Common Terns, Roseate Terns (*S. dougallii*; Hays 1970, Hopkins and Wiley 1972, Hulsman 1976), Laughing Gulls (*L. atricilla*, Hatch 1970), and Silver Gulls (*L. novaehollandiae*, Hulsman 1976). These reports are from breeding colonies, but interspecific kleptoparasitism occurs at other times of the year (Bartlett 1957, Siegfried 1972).

Age differences in foraging efficiency have been found for several species (Recher and Recher 1969; Orians 1969; Dunn 1972; Barash et al. 1975; Verbeek 1977b, 1977c; Searcy 1978; Morrison et al. 1978; Ingolfsson and Estrella 1978). In general, efficiency increases with age, although Buckley and Buckley (1974) found that juvenile Royal Terns (*Sterna maxima*) were just as successful in fishing as adults. Although age differences in foraging have been noted, no age differences in kleptoparasitism have been found. Where this factor has been examined specifically (Verbeek 1977a), it has been found not to exist. In this paper we report on age differences in kleptoparasitism of Ring-billed Gulls on Starlings (*Sturnus vulgaris*) observed at the Edgeboro Sanitary Landfill in East Brunswick, New Jersey, and consider if young or subadults compensate for lower success rates. In this study we classified gulls as young (birds of the year), subadults (birds with a dark tailband), and adults (birds with white tail, see Dwight 1925). Observations were made during October and November 1978, when gulls regularly foraged with the Starlings.

Gulls watched the Starlings and when a Starling picked up a food item, the gull flew or walked rapidly at the Starling, forcing it to drop the food. Starlings flew with the food or dropped it before flying. When Starlings flew with food, gulls either looked for another Starling or pursued the Starling aerially. We recorded the interval between attempts (when a gull moved toward a Starling with food) and the success of attempts in terms of foraging method and age.

The interval between robbing attempts varied with age, as the interval was significantly longer for young than for adults and subadults (Table 1). When the data were combined for the 4 days, there was no significant difference due to date, although age differences remained significant ($F = 22.87$, df = 4,168).

We recorded other parameters of foraging behavior on 20 November, when the Starlings and gulls fed in one location for over 5 h. A census showed 136 gulls (50% young, 20% subadult, 30% adult) feeding on the dump, whereas 45 gulls fed among the Starlings (24% young, 44% subadult, 32% adult). Thus, proportionately more subadults and fewer young engaged in kleptoparasitism.

The flock of Starlings was dense but not evenly distributed (ranging from 60–275 birds, $\bar{x} = 116 \pm 32$, for eight 64-m^2 quadrats). The mean nearest neighbor distance between Ring-billed Gulls was 5.35 ± 1.76 m, compared with 4.54 ± 4.58 m for an equivalent number of randomly placed gulls (random number table used to generate coordinates). The gulls were thus regularly rather than randomly distributed ($P < 0.001$) among the Starlings. Presumably, spacing themselves regularly among the clumped Starlings increased the potential for finding Starlings with food by reducing intraspecific competition.