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A STUDY OF WINTERING HOARY, COMMON, AND GREATER REDPOLLS, AND VARIOUS INTERMEDIATES OR HYBRIDS

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GENERAL STATUS. The Common Redpoll (*Acanthis linaria linaria*) is a rather irregular winter visitant in southern New England, being apparently entirely absent some winters, then appearing in fairly abundant numbers for a winter or two. Its somewhat erratic movements can doubtless be traced to the food-supply, wandering, as it does, southward and remaining wherever seeds to its liking are plentiful.

The Hoary Redpoll (*Acanthis hornemanni exilipes*) and the Greater Redpoll (*Acanthis linaria rostrata*) occur rarely in southern New England. Some few specimens of the Greater Redpoll have been taken in Massachusetts[1] and Connecticut[2], and more rarely have specimens of the Hoary Redpoll been taken.[3] Even sight records of these Redpolls are exceedingly rare, as it is only under favorable circumstances that they can be distinguished from the Common Redpolls. A recent survey of field reports at the Worcester Museum of Natural History revealed only one sight record for the rarer Redpolls for Worcester County during the past twenty-five years—a Greater Redpoll, seen with a flock of Common Redpolls on February 3d, 1914, by A. J. Green, a Worcester taxidermist.

Influx of 1935–36. During the winter of 1919–20 Common Redpolls were frequently seen. Since that time there has been a marked scarcity until the past winter, 1935–36, when they occurred in positive abundance. The unusual influx may have been due to the unprecedentedly severe winter, for 44.8 inches of snow fell during the period from January 1st to March 15th, and two months of frigid weather was broken only by a week's thaw the latter part of February. The mean temperature for the latter half of January was 17.6 degrees; that for February was 19 degrees, 5.6 degrees below the normal February mean temperature.

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The first Redpoll of the season seen in Worcester County was a single individual which rested for a moment only on a small pear tree at my banding station on November 15th. At that time it was considered quite a rarity. Its dark chin patch and red cap were clearly seen through 8-power binoculars at a distance of fifty feet. No other Redpolls were seen until the latter part of December, when approximately twenty-five Common Redpolls were startled from an alder thicket in a swamp about a quarter of a mile north of the same banding station. During the remainder of the winter, flocks of Redpolls were reported from all sections of the county, and it finally became known that their visitation was somewhat general throughout New England. Larger unidentified birds were frequently reported feeding with the Redpolls. The only authentic records of the rarer kinds, however, were one Hoary and one Greater Redpoll among some thirty Redpolls banded by Lloyd S. Jenkins, of 10 Ashmore Road, Worcester, and one skin of the Greater Redpoll made up and presented by him to the Worcester Museum of Natural History.

As the weather became more severe and the heavy snowfall crusted over, the flocks congregated near the houses, and on the first day of February two Common Redpolls ventured into my banding traps. Others drifted in gradually until the flock numbered about 110, though rarely could more than fifty be seen at one time. When the snow melted, the size of the flock diminished, the last ones leaving us on the 24th of March.

Food Preferences. Under natural conditions here in New England, Redpolls seem to prefer seeds of the gray birch (*Betula populifolia*) but they also eat seeds of alder (*Alnus incana*) and tamarack (*Larix laricina*) and, perhaps less frequently, weed seeds of various kinds. In their new environment at the banding station their choice of food was determined by placing the first ones captured in a cage containing a mixture of cracked corn, oats, barley, chick-feed, millet, buckwheat, hemp, and sunflower seeds. They immediately proceeded to pick out all the millet. When the millet was gone, they refused to eat for a full hour, then a fresh supply of the same mixture was offered them, and they again fed greedily on the millet alone. If the mixture had contained canary and hay seeds, undoubtedly those seeds would have been eaten also, as both were readily taken at other feeding stations.

Banding Records. During their seven weeks' stay 120 Redpolls were banded, including 6 Hoary, 69 Common, 32 Greater, and 13 individuals intermediate between Greater and Common Redpolls. All were captured at my banding station except 13 individuals that were taken at the home of Mr. and Mrs. Alvin Newman in North Brookfield, Massachusetts, at whose feeding station two loiterers remained until April 19th.

Location of Banding Station. My banding station in Worcester, Massachusetts, is located on the extreme eastern limits of the city, in a section built up comparatively recently to cottage houses. Approximately five hundred feet to the west, running north and south, are the tracks of the Boston and Albany Railroad, the high banks of which afford some shelter to the birds, especially in the swamps north and south of the banding station. The principal trees in the swamps are maples, birches, and alders, interspersed with smaller growth of elder, burdocks, evening primroses, and other weeds. Lake Park lies two blocks to the east on the west shore of Lake Quinsigamond. It contains several acres of open woodland and a pine grove. Our house at 11 Dallas Street is situated on a corner lot of seventy-five by one hundred feet. Woodrow and Dallas Streets are lined with cut-leaf maple and Carolina poplar trees of about twenty years' growth. There are several small fruit trees on this and adjoining property and lawn and garden plots with a few shrubs. A space thirty by forty feet on the easterly side of the house is sown to millet, hemp, and sunflower. All trapping during the winter is carried on in this area. The only trap in operation at the time the Redpolls arrived was a large elevated tray trap of the pull-string type built beneath a winter shelter. Small two-compartment Potter-type traps of vertical wire were immediately placed under the shelter to capture those birds preferring to feed on the ground.

Method of Study. Each bird banded was carefully measured and weighed, its plumage studied and exact colors recorded with the aid of Ridgway's "Color Standards and Nomenclature." Pertinent notes concerning behavior, voice, and other peculiarities of each individual were recorded in a small notebook.

General Behavior. Each morning at the first hint of dawn the Redpolls appeared at the banding station and remained in a small cherry tree until it was light enough to begin feeding. Some few remained all day, small flocks coming and going. Just as long as it was possible for them to see the seeds before them they ate ravenously, then at dusk, when it was so dark that we could barely see them go, they gathered in the cherry tree and from there invariably flew east, apparently to the pine grove for the night.

The Redpolls regarded humans with little interest. They were alarmed only by a sudden movement. By moving cautiously one could approach to within a few inches of them as they fed, and they were but mildly concerned when a hand moved slowly about among them. A springing trap sometimes startled them for a moment, but they invariably immediately returned to the feed. Their tameness made them easy prey for prowling cats, and although a sling-shot was kept constantly at hand, it became necessary to place the seeds only in the elevated tray and on a windowshelf upon which two small traps were set. As a rule they

fed peacefully, packed as closely as they could stand on the shelf, though occasionally one would open its bill in an unfriendly attitude toward a newcomer attempting to alight on that portion of the tray which the first arrival evidently considered its own particular property. They also associated agreeably with Purple Finches and Tree Sparrows.

Voice. As they fed they kept up a perpetual twittering similar to that of Goldfinches, but having a more rattling quality. At times one gave a plaintive canary-like call, which resembled the *swe-eet* call of the Goldfinch, but it was slightly more sharp and of longer duration. This call seemed to serve two purposes, those of a danger signal and a call to food. It was uttered with peculiar emphasis when there was a cat about, but was most frequently heard early in the morning while the flock was congregating in the cherry tree before starting to feed, at which time it was voiced by many members of the flock in a more rollicking manner. At dusk, when they were gathering to leave, or at odd times during the day when a few individuals left the station for a while, they delivered a few rapid notes very much like the *per-chic-o-pee* call of the Goldfinch, before flying away. This was in all probability a flocking call, for only those birds gathering to go elsewhere appeared to give it, the remaining birds paying not the slightest attention.

The calls of the Greater Redpolls were louder and more harsh, and it was always possible to tell by their twittering alone whether one or both kinds were on the shelf. The Greater Redpolls often emitted an additional call while being removed from the gathering cage, resembling nothing more closely than the sharp *whe-eep* of the Hermit Thrush. Notes of the Hoary Redpoll are said to be more sharp than those of the Common Redpoll, but although sharp notes were sometimes heard, it was never possible to segregate the individual giving the distinctive Hoary Redpoll call. They all voiced incessant *chee-chee-chees* while awing, and were in reality never quiet excepting when they sensed danger. Then they stopped feeding and there was a breathless silence, usually followed by a sudden rising of the whole flock, as that of a single bird.

Arrival of Rarer Kinds. The Common Redpolls were continually at the station from February 1st, but it was not until February 18th that a number of Greater, some few Hoary, and various intermediate Redpolls arrived, during a raging blizzard. Since it was feared that they might leave as unexpectly as they had come, hand capturing was attempted. The window was slowly raised, and a hand, reached cautiously out, was carefully cupped about the desired individual, which was brought slowly inside without unduly disturbing its companions. Many unbanded Redpolls were taken in like manner on this and subsequent days. If an individual displayed some nervousness, instead of attempting to capture it by hand, I gently shoved it toward a trap entrance.

Color of Bills of All Kinds. The bills of all kinds of Redpolls examined were yellow to dusky or orange with dusky tip and edgings, and less frequently dusky on ridge both above and below, varying considerably in separate individuals.

Discriminative Characteristics of the Hoary Redpolls. The lighter-colored plumage, especially the mouse-gray loral streak, chin, and nasal tufts, the white rump, broad white edgings of the wing coverts, and white inner webs of the secondaries, forming a light patch on the closed wing, readily distinguished the Hoary from the Common Redpolls, though as the season progressed it became increasingly difficult to separate the two kinds in the field because the railroad and city smoke darkened the feathers unbelievably. Tree Sparrows wintering in the same region were nearly a uniform dark gray.

A comparison of the measurements of the Hoary and Common Redpolls in the accompanying table (Table I) shows slight variation in length. However, the body of the Hoary is noticeably smaller than that of the Common Redpoll, a fact not realized until the two kinds are handled, for the plumage of the Hoary is more fluffy. Their nearly equal length is accounted for by the uniformly longer tail of the Hoary Redpoll. Proof of the smaller body is borne out by the lighter weights (Table I). In spite of statements to the contrary, the bill of the Hoary appeared to be more acute than that of the Common, and in reality it was so, at least in the few specimens that were handled, for though the average length of the culmen was only slightly shorter, the depth was markedly less.

Plumage of Hoary Redpolls. Four of the six Hoary Redpolls were males, two having rosy cheeks, breasts, and rumps; the rosy color of the third extended to the bend of the wing, and the fourth was the most highly colored, having its flanks and under tail-coverts suffused with pink. One of the two supposedly female Hoary Redpolls possessed a rosy rump; the other was recorded as having a rosy tinge on cheeks and rump. Only one of the six was found to have under tail-coverts entirely unmarked, this being the most rosy of the males. Under tail-coverts of the remaining five were sparingly streaked, in some cases streaking being restricted to the two or three longer feathers.

The dark areas of the wings and tail of the Hoary Redpolls were hair brown, the back was light drab mixed with whitish, the breast and belly white to smoke gray, the nasal tufts, lores, and chin-spot drab to mouse gray. The spot on top of the head was oxblood red, glowing carmine in the sunshine, with the exception of one female that had a bronzy-colored cap. The breasts, cheeks and rumps of the males were eosine pink, but one male had a bronzy wash on the left side of the breast. Forehead and cheeks were sometimes tipped with white, exhibiting a somewhat frosted appearance.

Plumage of Common Redpolls. The dark areas of the wings and tail

TABLE I

Species	*Number of Individuals*	*Length*	*Wing*	*Tail*	*Exposed Culmen*	*Depth of Bill*	*Tarsus*	*Diameter of Eye*	*Weight in Grams*
Hoary.....	6	121.00–127.50 (124.42)	71.50–75.00 (73.17)	56.00–58.50 (57.50)	8.00–9.00 (8.42)	5.50–6.00 (5.92)	13.00–15.00 (14.25)	2.50–2.75 (2.62)	10.70–14.20 (12.29)
Common.....	69	118.00–132.00 (125.52)	68.50–77.00 (72.93)	49.50–61.00 (55.71)	7.00–9.50 (8.45)	5.50–8.00 (6.71)	13.00–16.00 (14.40)	2.75–3.00 (2.88)	11.50–16.40 (14.05)
Intermediates... (between Greater and Common)	13	124.00–133.00 (129.00)	71.50–76.50 (74.31)	52.50–64.00 (57.81)	7.75–9.00 (8.45)	6.50–7.00 (6.73)	13.00–15.00 (14.50)	3	13.40–16.40 (15.24)
Greater.....	32	131.00–141.50 (135.97)	72.00–84.00 (78.47)	54.50–66.00 (61.41)	8.00–9.50 (8.95)	6.50–8.00 (7.15)	14.00–18.00 (15.93)	3.00–3.50 (3.25)	15.60–20.00 (18.06)

TABLE II

	Dark Areas, Including Rectrices, Remiges, and Streaking on Back and Sides	*General Color of Back*	*Under Parts, Including Breast and Belly of Females, and Areas Not Rosy in Males*	*Nasal Tufts and Chin-Patch*	*Spot on Top of Head*	*Breast of Males*	*Cheeks of Males*	*Rump of Males*	*Edgings of Wing-Coverts*	*Shape and Color of Bill*
Hoary Redpoll	Hair brown	Light drab, mixed with hair brown and white	White to smoke gray	Drab to mouse gray	Oxblood red glowing carmine in sunshine (exception: one with bronzy-colored cap)	Eosine pink	White tipped mixed with eosine pink	Eosine pink	White (broad)	Acute(straight outlines). Yellow, tipped and edged with dusky
Common Redpoll	Fuscous	Hair brown to light drab mixed with white and fuscous, varying greatly,feathers often buffy-edged	Smoke gray	Fuscous to grayish olive	Victoria lake to nopal red, glistening spectrum red to scarlet in sun (exceptions: 2 with bronzy-colored caps)	Begonia rose rarely paling to eosine pink and shrimp pink	Begonia rose to rose doree (exception: one with carmine)	Shrimp pink, eosine pink and begonia rose	Light gray (more narrow than hoary)	Acute (straight outlines). Yellow, tipped and edged with dusky
Greater Redpoll	Chaetura black	Hair brown and buff mixed with chaetura black	Smoke gray (sometimes buffy-edged) tail-coverts and flanks smoke gray heavily streaked	Hair brown	Oxblood red glistening nopal red through garnet brown and carmine to Brazil red-orange rufous and burnt sienna-salmon orange	Smoke gray in rare cases slightly washed eosine pink	Smoke gray and hair brown (cheeks in one case slightly washed eosine pink)	Smoke gray and hair brown (in 2 cases slightly washed eosine pink)	Very narrowly edged gray	Convex, conic, bulging. Yellow to dusky, tipped and ridged with dusky (exception: one with orange bill)

of the Common Redpolls were fuscous, back hair brown to light drab, mixed with white and fuscous, varying greatly, feathers often being buffy edged. Breast and belly of females were smoke gray, nasal tufts and chin-spot fuscous to grayish olive. The spot on top of the head ranged from victoria lake to nopal red, and in the sunshine glistened spectrum red to scarlet. Two individuals had bronzy-colored heads. The throat and cheeks of most males were begonia rose to rose dorée, but one had a throat of carmine. The breast was most often begonia rose, rarely paling to eosine pink and shrimp pink. The most common rump recorded was shrimp pink, others were eosine pink and begonia rose. Only 17 of the 69 Common Redpolls had rosy breasts and were on that account called males. Undoubtedly many with rosy cheeks and rumps were young males.

Distinctive Characteristics of Greater Redpolls. The large size and dark coloration of the Greater Redpolls quickly set them apart from all other kinds. Additional distinctive characteristics were their bulging bills and upright posture, so different from the others with bills of straight outlines and postures somewhat crouching. As they stood on the shelf they appeared to be more than twice the size of the others.

Plumage of Greater Redpolls. The dark areas of the Greater Redpolls, that is, wing and tail feathers and also streaking of sides and tail-coverts, were chætura black, the breast feathers were smoke gray, in several cases buffy-edged. Feathers of the back were mixed hair brown and buff, chin and nasal tufts, hair brown. Flanks and tail-coverts were smoke gray, heavily streaked. The greater and middle coverts were very narrowly edged with gray. The spot on top of the head of the Greater was much smaller than that of the other Redpolls, and the color was more inclined to the orange shades, ranging from oxblood red which glistened nopal red in the sun, through varying shades of garnet brown and carmine to the two most peculiarly colored individuals, one with a spot of Brazil red overcast orange rufous, the other having a spot of burnt sienna, glowing salmon orange in the sun. Three of the 32 Greater Redpolls showed some rosy coloring elsewhere than on the head. One was recorded as having the breast slightly washed eosine pink, one had a rosy tinge on the rump, and a third, the most highly colored of the group, had a rosy tinge on cheeks, breast, and rump. Apparently males do not attain the rosy coloring until the first postnuptial molt, or perhaps some individuals never do. The above-mentioned skin in the Worcester Museum of Natural History is that of a male but shows no trace of rosy plumage except the red cap.

NOTES ON INDIVIDUALS INTERMEDIATE BETWEEN GREATER AND COMMON REDPOLLS

The 13 intermediates represented the most interesting group, as no two were alike. To prove their hybridism, the peculiarities of each individual are presented in the following records from my notebook: No. 1: Size and weight leaning toward Greater, shape of bill and general coloration more like Common. No. 2: Larger than Common, smaller than Greater, weight of Common, bill conic but too small for typical Greater. No. 3: Length of Common, weight of Greater, color of Greater, bill of shape of Common. No. 4: Length of Common, weight of Greater, bill conic, though small, color more like Greater. No. 5: Length and weight of large Common, bill conic, general color intermediate between the two. No. 6: Length of Common, weight intermediate, bill quite conic, color intermediate, suffusion of color, always lacking in Greater, dark remiges and rectrices narrowly edged like Greater. No. 7: Length of Common, weight of Greater, bill, shape of Common though short, color intermediate. No. 8: Length and weight of Greater, bill and color intermediate. No. 9: Length, weight, and color intermediate, leaning toward Greater, bill of Common. No. 10. Length, weight, and color intermediate, bill quite conic but too narrow for Greater. No. 11: Length decidedly of Common weight of Greater, color of Greater, bill intermediate. No. 12: Length and weight intermediate, bill shape of Common, color intermediate, leaning toward Greater. No. 13: Length of Greater, though wing-length of Common, weight and bill intermediate, great suffusion of color absent in Greater, garnet brown head peculiar to Greater, never to Common. Only five of the group possessed the rosy plumage of the male. Because of their distinctive peculiarities all were readily classed as intermediates between Greater and Common Redpolls.

Various Groups of Intergrades. Group 1.—Among the 69 Common Redpolls were four abnormal individuals which were apparently intergrades as the following notes suggest: No. 1: Length of Common, weight and plumage of intermediate, heavier and darker than typical Common. No. 2: Length and weight of Common, plumage dark and posture upright, as in intermediate. No. 3: Length and color of Common, weight and bill of intermediate. No. 4: Length and shape of intermediate, color and weight of Common. Each displayed some characteristic not typical of true Common Redpolls, and suggested an intergradation of the Common and intermediate kinds.

Group 2.—There were nine individuals that showed hybridism between Hoary and Common Redpolls. They generally had lighter-colored rumps, smaller bodies, longer tails, narrower bills, remiges more broadly edged than typical Common Redpolls, but not one displayed the light coloration peculiar to the Hoary Redpolls.

Group 3.—Three seemed to be intergrades between the intermediate group and Hoary Redpolls. Two of these were even too large to be Common, but had light rumps and practically unstreaked under tail-coverts. The third was an extremely small-bodied bird with the narrow edgings of remiges characteristic of the intermediate group.

These three groups have been classed with the Common Redpolls, as well as several small-bodied birds which displayed no characteristics of the Hoary other than size, and were therefore assumed to be Common females. The fact that these irregular intergrades were placed in the Common class accounts for the wide variation of color, and also of measurements and weights given in the accompanying table (Table 1).

Comparisons of Skins with Living Birds. I am deeply indebted to Mr. James L. Peters for a survey of the entire series of Redpoll skins at the Museum of Comparative Zoölogy in Cambridge. We found that all measurements of skins conformed with those of my living birds. Colors coincided, with the sole exception of darkened feathers of the living specimens which were soiled by city smoke. An examination of skins of the Greater Redpoll revealed a low percentage of rosy males, which agreed with that of living birds studied. Although the rosy plumage of the breast, at least, is not acquired until the first postnuptial molt,[4] the number of rosy males present still seems very small, and Mr. Peters has suggested that adult males may migrate to a lesser degree than females and young, which would be an additional factor in accounting for their scarcity.

The North American skins erroneously labeled Holboell's Redpoll were inspected, and all were readily allotted to the various classes of intermediates; none possessed the very long and narrow bill peculiar to the true Holboell's Redpoll.[5]

Additional Records of Rarer Kinds. Additional specimens of the rarer kinds taken in Massachusetts are the following skins in the Thayer Collection: one "*holbœlli*" not sexed but female by plumage, Lexington, Massachusetts, March 10, 1890, of which the measurements are: wing, 72 mm., tail 68.5, culmen 8.9, depth of bill 5.8, six *rostrata* (unquestionably) taken at Newton, Massachusetts, 1896, consisting of a female February 11th, female March 4th, adult male and immature male March 6th, two females March 9th.

Summary. Weather conditions and food-supply obviously influenced presence and irregularity of wintering Redpolls. When their supply of natural food was exhausted or nearly so, they quickly became accustomed to unnatural conditions presented by feeding stations, where their ravenous appetites were satisfied mainly by millet, grass, and canary seeds. They exhibited little fear of man, and in these unnatural surroundings easily and all too frequently fell prey to the ubiquitous cat. A safe feeding place offered an excellent opportunity for study of the living bird. Capturing the birds

both by traps and by hand effected a thorough and systematic study of each individual bird. Their distinctive social flocking habits, if somewhat erratic, their calls of unceasingly pleasant notes, and their plumages of varying shades and brilliance, not to mention the very dearth of rarer kinds recorded, all combined to make their study a most fascinating objective.

The Hoary Redpoll can readily be called the rarest of all kinds studied. In "The Birds of Minnesota,"[6] the Hoary Redpoll is described as "the largest and lightest colored of the Redpolls." This misleading description would do very well for the Greenland Redpoll (*Acanthis hornemanni hornemanni*), a specimen of which has recently been taken in Michigan.[7] Barring the Greenland Redpoll, the Hoary is the lightest-colored, but in size it ranks smallest, being of lighter weight than the Common Redpoll. Some large individuals of the Hoary approach the Common in length, owing to their longer tails. Their fluffy plumage often belies their diminutive size.

The Greater Redpoll possesses characteristics of a more outstanding quality than any of the other kinds studied. Its size, coloration, voice, posture, and shape, particularly the shape of the bill, emphatically place it in a class by itself. Then, too, its general behavior in the field is more typically that of the larger finches than of the smaller Redpolls. Intermediates between Greater and Common, also intergrades of somewhat questionable parentage, cause confusion and tend to make field identification unreliable.

Apparently intermediates between the Greenland and Greater Redpolls have never been taken, though both spend the breeding season in Greenland. A systematic study, particularly by banders of the Middle West, where the Greenland Redpoll occasionally occurs, might reveal such an intergradation.

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[4] Dwight, Jonathan, Jr.: The Sequence of Plumages and Moults of the Passerine Birds of New York. *Annals New York Academy of Science*, Vol. XIII, No. 1, 1900, p. 178.

[5] Note: The two specimens of "*holboelli*" taken by William Brewster in 1883 have not been accessible to me for examination.

[6] Roberts, T. S.: The Birds of Minnesota, p. 702.

[7] Bryens, O. M.: *The Auk*, Vol. LII, 1935, p. 95.