

The Biology of the Whitewinged Grosbeak, *Mycerobas carnipes* Hodgson, in Kazakhstan

BY

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(With six plates and a text-figure)

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INTRODUCTION

The Whitewinged Grosbeak is a common bird of the subalpine belt of mountain ranges in the upper Mekong and Yangtze, of the ranges of Central Asia, the Himalayas, mountains of Kashmir, Afghanistan, Northern Iran, the Kopet Dag and the Big Balkans, the Pamiro-Alai and the Tien Shan ; it is considerably less common in Saur and occurs only rarely in the Altai (it was found in February 1954 in the upper Biya tributaries ; Ternovsky 1956). Though the distribution and occurrence of this bird is rather wide and in some places the species is quite numerous, its distribution, and especially its ecology, have not been investigated thoroughly. Very little knowledge has been obtained concerning its breeding biology, e.g. about the characteristic biotopes, nest sites, period of laying, time of hatching, and other aspects of its life in the period of reproduction.

The authors were able to follow some aspects of the nesting biology of this species while working in the Zailiysky Alatau. Observations were made in 1964-65 in the area of the Big Almatinsky Lake (2500 m.¹) ; in addition the observations which had been made some time before in different gorges of the Zailiysky Alatau and in the Saur have been used in the paper. The authors have also collated information found in the literature for nearby localities.

¹ Here and further on it means height above sea-level.

HABITAT AND NUMBERS

In the Zailiysky Alatau the Whitewinged Grosbeak is a rather common bird, while in some appropriate localities it can be considered even numerous. During the nesting season the distribution of this bird is closely related to the occurrence of juniper (*Juniperus*); the ranges of distribution of all the species of this plant (*J. turkestanica*, *J. sibirica*¹) represent the range of the Whitewinged Grosbeak as well. The relations of this species with the juniper are exceedingly close. This has always been stressed by every naturalist, and we in our turn confirm this fact. The number of the Whitewinged Grosbeaks depends on the area occupied by the juniper. The species is most numerous in the belt of maximum growth of the juniper, i.e. at an elevation of 2600-2900 m. (Plate I). Still higher, where juniper thickets become sparse, the number of the Whitewinged Grosbeak is considerably less, but it still occurs up to the last shrubs of juniper, i.e. under conditions of the Zailiysky Alatau—up to 3100-3200 m. On May 31, 1965, we twice met single birds above 3500 m. where they were in company with the Redbreasted Rosefinch (*Pyrrhospiza punicea*). Most probably the birds were feeding on other plant seeds there as no juniper shrubs were present. The lower limit of nesting of the Whitewinged Grosbeak is also determined by the lower limit of the juniper. In the Big Almatinska gorge, isolated clumps of juniper can be found deep down the canyons, in the middle belt among the spruces growing at an altitude of about 2200 m. Individual pairs of this species nest in these, so probably this height may be considered the lower limit of the nesting of this bird. Thus, the vertical breeding range of the Whitewinged Grosbeak in the Zailiysky Alatau lies between 2200 and 3200 m.

The number of nesting birds in this range varies. At an altitude of 2200-2400 m. it is a very rare bird occurring as individual pairs near isolated clumps of juniper bushes. At an altitude of 2400-2600 m. the Whitewinged Grosbeak becomes quite common and is distributed more or less evenly coincident with the wide distribution of juniper thickets. At altitudes of 2600-2900 m., in the region of predominance of juniper thickets on the hillsides of southern and related exposures, the Whitewinged Grosbeak is very numerous, being as a rule, the most numerous of all the birds inhabiting the juniper growth. Higher up its numbers decrease again, while on the boundaries of the juniper zone the bird is very rare.

At altitudes of 2600-2700 m. the spruce (*Picea schrenkiana*) grows both as separate trees and in groups among the junipers, while below 2600 m. the juniper growth has a subordinate role: here the fir-wood

¹ In the vicinity of the Big Almatinsky Lake there is no arborescent juniper.

Dolgushin : Whitewinged Grosbeak



Nesting site of the Whitewinged Grosbeak. Juniper thickets.

(Photo : E. Gavrilov)

Dolgushin : Whitewinged Grosbeak



Nesting site of the Whitewinged Grosbeak. Upper boundary of fir-wood.

(Photo : E. Gavrilov)

formation is predominant (Plate II). In the belt of coniferous forest the juniper grows mostly on the bare southern versants, in clearings as well as in areas of thin forest. Under conditions of rugged topography of various assemblies of versants of different exposure the distribution of any plant association is of a very complicated nature. It should be noted that the presence of the spruce does not influence distribution of the Whitewinged Grosbeak and its population density, because its numbers in the optimum range of junipers is the same both in pure juniper stands and in juniper forest mixed with fir-wood (or in fir-wood mixed with juniper).

The following feature is very characteristic of the number of Whitewinged Grosbeak. On the southern versant of the ridge, two kilometres in length at its relative elevation exceeding 200-250 m., about 20 to 25 pairs of this species were nesting. This was a site of almost pure juniper growth; only in one place there was a group of 15 spruces. The same density was observed in another area occupied by fir and juniper in approximately equal proportions.

Analogous distribution of the Whitewinged Grosbeak was observed on other ridges of the Tien Shan. On the Dzhungar, Terskey and Ketmen ridges the maximum number was noted in the juniper-spruce belt (Koreev & Zarudny 1906, Stepanyan 1956, Korelov 1956). On the Kirghiz ridge the Whitewinged Grosbeak mainly inhabits the zone of arborescent juniper (*Juniperus semiglobosa*, *J. zeravschanica*) at elevations of 1800 to 2400 m. (Kuznetsov 1962). In the Talass ridge this bird mainly inhabits the zone of creeping juniper (*J. turkestanica*), while below, in the thickets of arborescent juniper, it is very rare (Kovsharj 1966).

FIELD CHARACTERISTICS AND FOOD

The Whitewinged Grosbeak is one of the largest representatives of the family Fringillidae. It is the size of a starling, but with a longer tail and the body set lower. The front and the tail of the adult male are black, its abdomen and tail-coverts are yellow-green. The remiges are dark brown with narrow greenish-yellow edges, and on its wing there is a small white speculum. The female has the same coloration, but instead of black it is dark grey.

15 males measure: wing 109-124 mm. (mean 115 mm.); tail 97-121 mm. (mean 104 mm.); bill length 15.2-19.7 mm. (mean 17 mm.); bill height¹ 15.2-17.8 mm. (mean 16.7 mm.); weight (11 specimens) 56-63 gm. (mean 59.7 gm.).

18 females measure: wing 109-120 mm. (mean 114.4 mm.); tail 82-118 mm. (mean 102.8 mm.); bill length 13.8-17.7 mm. (mean

¹ On the level of the front edge of the nostrils.

15.0 mm.); bill height 14.2-17.0 mm. (mean 14.7 mm.); weight (14 specimens) 50.5-66.0 gm. (mean 58.2 gm.).

The Tien Shan is inhabited by the subspecies *M. c. merzbacheri* Schalow (Keve 1954 ; Stepanyan 1964).

The flight of this bird is very fast and undulating. On the ground it moves in hops. Its voice is coarse, loud and far-carrying. The sound may be transcribed as *che-gah-gah*, *che-gah-gah*. It is not too shy, and while feeding in a juniper bush may be approached within 3 to 5 metres.

From external appearance, the Whitewinged Grosbeak is a typical granivorous bird. Visual observations, analysis of the stomach and gullet contents, as well as its close attachment to juniper thickets show an extremely narrow food specialization. It is enough to say that during the whole year the staple food of the birds is just the seeds of juniper. The abundant fruit-bearing of this plant and slow ripening of the seeds (up to two years) ensure a constant food supply for the Whitewinged Grosbeak during the entire year. Although juniper fruits may be eaten by other birds too (thrushes, Alpine Chough, etc.), it is only the Whitewinged Grosbeak with its powerful bill that can utilise the juniper seeds easily cracking the thick seed coat. The great quantity of fruits borne on a single bush makes it possible for the birds to feed in one place for a long time. As a result, the ground under the bush becomes thickly strewn with the fruit meat and shells of juniper seeds.

L. M. Shulpin (1953) described the feeding of the Whitewinged Grosbeak as follows : '... it opens its beak not very wide, owing to sharp ends it bites the fruit from its side ; the bird thrusts its beak into the meat and with sharp edge of the jaws simultaneously assisted by the very peculiar spoonlike tongue, very quickly cleans the stone from meat and shell which fall on the ground. The sides of the under half of the bill are thick, with a swelling at the base ; the size of the thick part is almost as thick as a pea, its upper part is flat and covered with parallel small ribs, like notches. On the upper half of the bill there is a special corresponding swelling. As a result it looks something like a pliers, on which the stone is fed by the spoonlike surface of the tongue, and crushed by the strength of the large jaw muscles, although the stone may be very hard. The convenience and force of this mechanism are evident when we consider that this stone cannot be split by human teeth, besides it slips easily off the teeth'.

In fall and winter, the birds descend to the lower mountain belts, where they have to eat other food as there are no thickets of juniper. In the middle belt of fir-wood the Whitewinged Grosbeak enjoys fruits of the mountain ash ; even the young birds whose bills are still not strong enough can split the seeds. It is known that the Whitewinged Grosbeak can also eat spruce seeds after extracting them from the cones. In the zone of deciduous forest the birds feed on the seeds of rose and haw-

thorn ; they may also peck the apples remaining on the trees and extract their seeds. On the xerophyte mountains in winter, the Whitewinged Grosbeak feeds on seeds of the Persian parrotia (*Celtis caucasica*), mountain cherry (*Cerasus* sp.), and rose. It eats only the fruit-stones of these plants, discarding the juicy pulp of the fruits and berries.

Whitewinged Grosbeaks feed their nestlings mainly with juniper seeds ; most probably they bring these seeds in their mouth and not in the 'craw'¹, as before feeding them to the nestling they do not produce any regurgitating movements typical of other finches. However, on the whole, they feed their young, like all other finches, with mixed food, though animal food plays an insignificant role in their diet. In the stomachs of five nestlings, besides juniper seeds, there were found beetles (Curculionidae) in all five, larvae of Orthoptera in one, an egg pouch of Orthoptera in one, larva of a leafhopper in one, molluscs in three stomachs.

BREEDING BIOLOGY

The time of pair formation in the Whitewinged Grosbeak is unknown. From the beginning of April the majority of the birds could be seen in pairs. Although flocks of 10, 18 and 16 individuals were seen on 10, 17 and 22 April respectively, it was evident that birds in these flocks were in pairs.

On April 13 and 18 several fights between individual Whitewinged Grosbeaks were observed. It is quite probable that these conflicts occur when the birds are occupying nesting sites.

Unlike many finches, Whitewinged Grosbeaks do not exhibit any vocal ability. The song of the male is very simple and short, merely a low chirping and melodious piping. It is not very often that their singing is heard ; we heard it only twice : August 14, 1964 and April 1, 1965.

We succeeded in discovering 28 occupied and 27 old nests of the Whitewinged Grosbeak. 36 of them (65%) were built on spruce trees and 19 (35%) on junipers ; we failed to find their nests on other bushes (mountain ash, honeysuckle, etc.). It may thus be assumed that the species builds its nest with equal facility both on the juniper and on the spruce. The figures given above are too small for generalizing about the preferential selection of the spruce for its nest site, and it is quite probable that chance plays an important part in this.

The nests in juniper were built 0.6 to 1.8 m. above the ground, averaging 1.2 m. (ten measurements) ; and 20 to 70 cms. below the bush tops. The majority of nests are very well covered by the foliage and

¹ The 'craw' in passerines is a small enlargement of the gullet.

hidden from all sides. Only one nest was built in such a way that it could be seen from 12 m. down below in the gorge.

The spruce trees with nests were of various sizes. The height of 34 observed nest trees, varied from 0·6 to 20 m., averaging 6·3 m. The nests were built 0·4-14·5 m. above the ground (average 3·2 m.). In most cases the nests were built on small spruces 2·5-5·0 m. tall ; however three nests were found quite high above the ground. One was in a spruce 20 m. high, and built 14·5 m. above the ground ; the second was built on an inclined tree 12-13 m. from base and 1·5-2·0 m. below its top ; the third one was built 12-14 m. above ground and 4 m. from the tree top.

The nests in the spruce trees were built both near the trunk as well as out on the boughs. Of 28 nests 18 (64%) were built near the trunk, and 10 (36%) on the boughs 5 to 200 cm. from the trunk (mean 60 cm.). The majority of the nests (88·5%) were situated on the southern side of the trunk. Of 26 nests, 14 were on the southern side, 7 on the south-western side, 2 on the south-eastern side, 1 on the eastern, and one on the north-eastern sides.

The nests consist of two layers. The outer layer is made of various materials such as twigs of spruce trees, juniper, spireas, honeysuckle, and of the last year stems of different herbs ; sometimes elongated dry leaves were interwoven in the nest. As a rule, the twigs used for nest base are comparatively slender, usually 2 to 4 mm. thick or a little thicker. Twigs of the spruce have been observed only in the nests built in spruce trees, while twigs of juniper and other brushwood could be observed in all nests. The external layer may consist either of twigs only, or mainly of dry grass, or it may consist of both of these materials in approximately equal quantities. In three nests some green moss was found in the external layer.

In every nest we found that the inner layer consisted exclusively of thin strips of juniper bark and bast fibre, which were rather long (up to 30 cm., usually from 10 to 15 cm.) and wide (up to 1·5 cm., usually from 0·3 to 1 cm.). This layer of strips of juniper bast represented essentially the lining of the cup ; there was neither grass nor wool mixed in it. Only in one nest we found that besides juniper bast there were a few pieces of moss. This structure enables nests of the Whitewinged Grosbeak to be distinguished from the nests of all other birds nesting in the Tien Shan mountains.

Measurements made of 15 nests were very similar. The smallest nest was 122 mm. in diameter, the largest one 200 mm. (mean 163 mm.). The diameters of the nest-cups ranged from 70 to 90 mm. (mean diameter 81 mm.). Most of the nests had a cup of a very regular round shape, and only few nests being squeezed between the branches had oval cups. Thickness of the nest 71 to 120 mm. (mean 95 mm.) ; depth of the cup 40 to 70 mm. (average 57 mm.).

Thus, nests of the Whitewinged Grosbeak in their shape and structure resemble those of a medium type nest of finches; their cups are quite deep. The nests are 'cold', and without any lining of animal hair or wool or bird feathers. These factors, as we shall see later, are very important.

The nest is built by the female alone, the male only accompanies her. When the female is busy tearing off the bark from the juniper bushes or placing the building material into the nest, the male sits on the top of a nearby juniper or the spruce tree, periodically calling in subdued tones. Only once did we observe a female building the nest when there was no male around. Moreover, this female was calling while building, which normally never happens; females build the nest in silence. Later this nest was deserted before the eggs had been laid.

Building materials are usually gathered by the female somewhere in the neighbourhood, about 20-40 m. from the site. However some cases were observed when the female had to fly about 100 m. from her nest. The female is usually busy building in the first half of the day; only once did we see a bird carrying a twig at 5.30 p.m. The frequency of flying to and fro with building material varies. One female was observed carrying pieces of bast five times between 9.45 a.m. and 10.00 a.m. Another flew three times between 11.00 a.m. to 11.30 a.m., putting the bast into the nest, while between 11.30 and 12.00 she flew in only once. It appears that intensity of nest-building is greatest during the morning hours; around noon the building activity ceases. It is resumed in the afternoon though with much less intensity.

The Whitewinged Grosbeak usually begins laying two or three days after the nest has been completed. The female produces one egg every day during the morning hours. Only once did we observe a female lay her fourth egg three days after the third one. Incubation commences after the laying of the third egg; before that the eggs in the nest remain cold and unattended.

A complete clutch consists of 3 to 5 eggs (Plate III, *above*). All the nests we found in the Zailiysky Alatau contained 3 or 4 eggs; however in the Terskey Alatau Range two out of three nests contained 5 eggs, while in the third nest there were four eggs (Stepanyan 1956).

The eggs are smooth with a slightly glossy shell of light olive colour. On the background there are scattered bright superficial dark brown, almost black, spots, specks and commas and light violet-brown spots in depth. The superficial spots are sharply outlined, while the underlying ones have diffused margins so that the pattern on the shell looks like marble.

The size and shape of eggs are given in Table 1. The weight of unincubated eggs may be 5.4, 5.5, 5.9 and 6.1 gm., while well incubated eggs weigh c. 5.0 to 5.2 gm.

TABLE 1

SIZE (MM.) AND SHAPE OF EGGS OF THE WHITEWINGED GROSBEAK ¹

		Minimum	Maximum	Mean	Number measured
Length	..	25.1	30.0	27.7	26
Width	..	17.4	20.5	19.4	26
Width					
Shape	..	0.61	0.77	0.70	26
Length					

¹ The Table includes the size of 8 eggs given by L. S. Stepanyan (1956) for the Terskey Alatau Range.

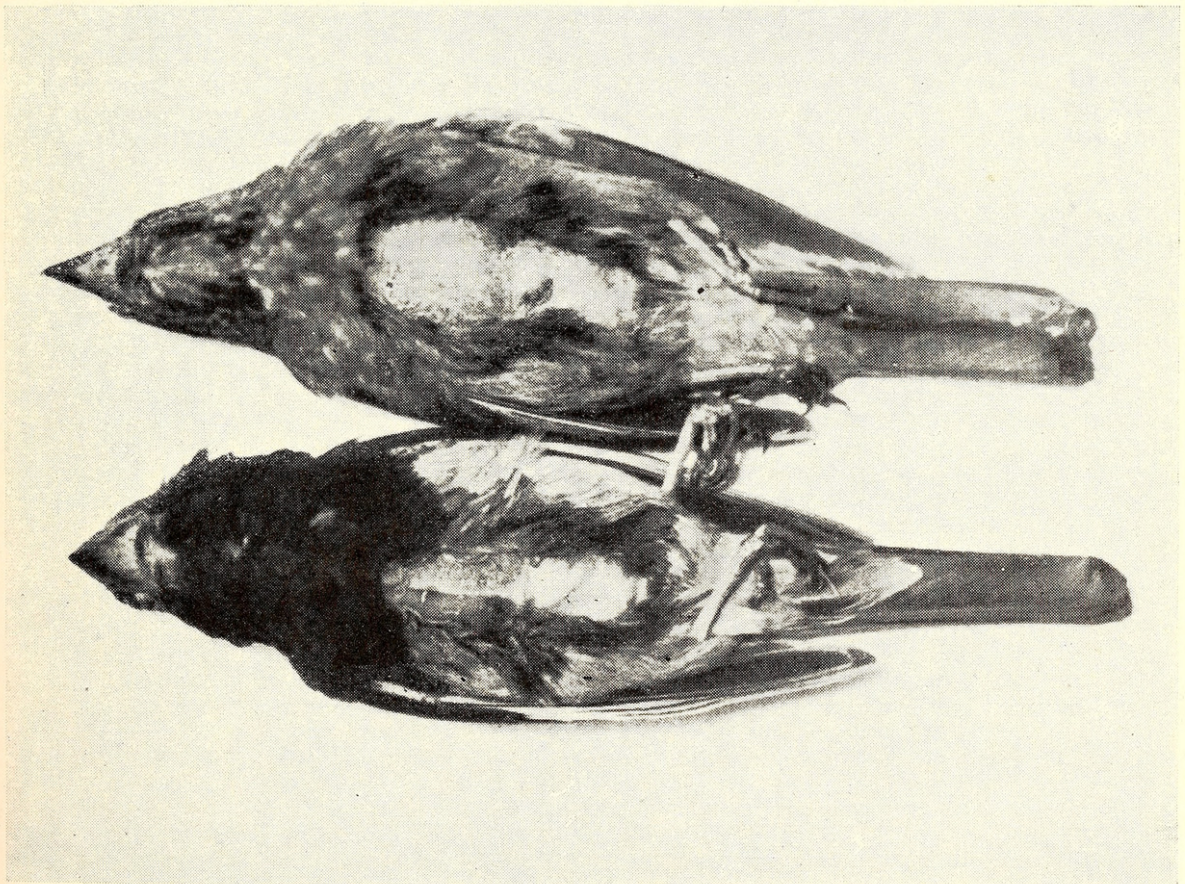
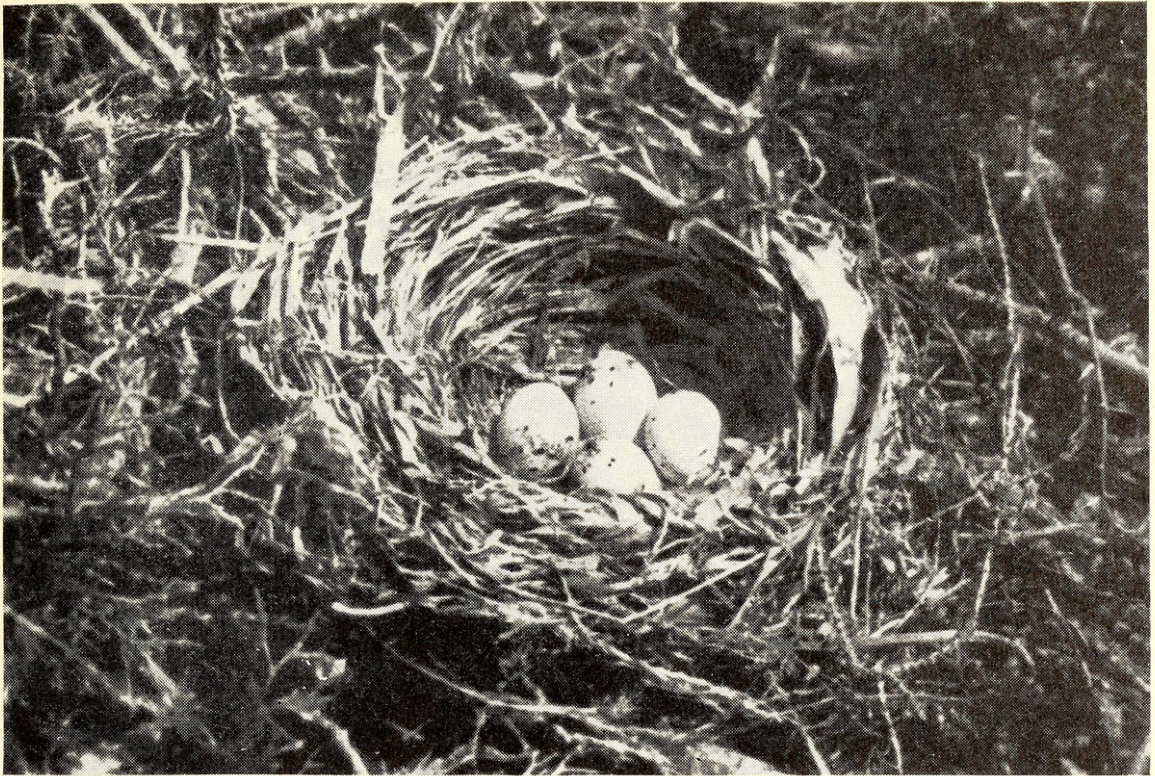
Both parents take part in incubation of the clutch. The main part however belongs to the female ; 32 out of 35 birds observed on the nests (or 91 %) were females, and only 3 (or 9 %) were males. It appears that there is no special time for the male to relieve the female on the nest ; we observed incubating males at 9.25 a.m., 11.00 a.m., and at 7.00 p.m. Each parent has a well developed brood patch (Plate III, *below*). In the female it is much more developed and of much bigger size than the male. We have not observed if the male feeds the female while the latter is incubating, but on two occasions (April 17, June 15) we observed the male feeding the female outside the nest.

The incubation period was established for two nests. In one the first egg was laid on June 13, while the third one appeared on June 15, and incubation started from the same day (the fourth and last egg was laid on June 16). The first egg hatched on June 30 ; the next day the nest was destroyed by a magpie. In the morning there was only one egg left, which also disappeared by midday. Thus, the first egg hatched after fifteen days of incubation. In the other nest the first egg was laid on June 14, incubation started from June 16, and after 16 days (on July 2) all eggs hatched. The observations showed that the incubation period of the Whitewinged Grosbeak is 15 or 16 days.

The young do not hatch simultaneously. Usually on the first day three chicks are hatched while the fourth one hatches on the second day. In rare cases one egg hatches on the first day, two more on the next day and the last egg only on the third day. Only one case was observed where the last egg hatched three days later than the first ones. Differences in the age of the chicks are especially marked during the first few days of life ; later on their sizes become more uniform.

The chicks are hatched blind ; according to our observations their eyes open on the third or fourth day. Their bodies are covered rather thickly with light-coloured grey down with a very peculiar tint (Plate IV, *above*), very difficult to describe or compare with anything else.

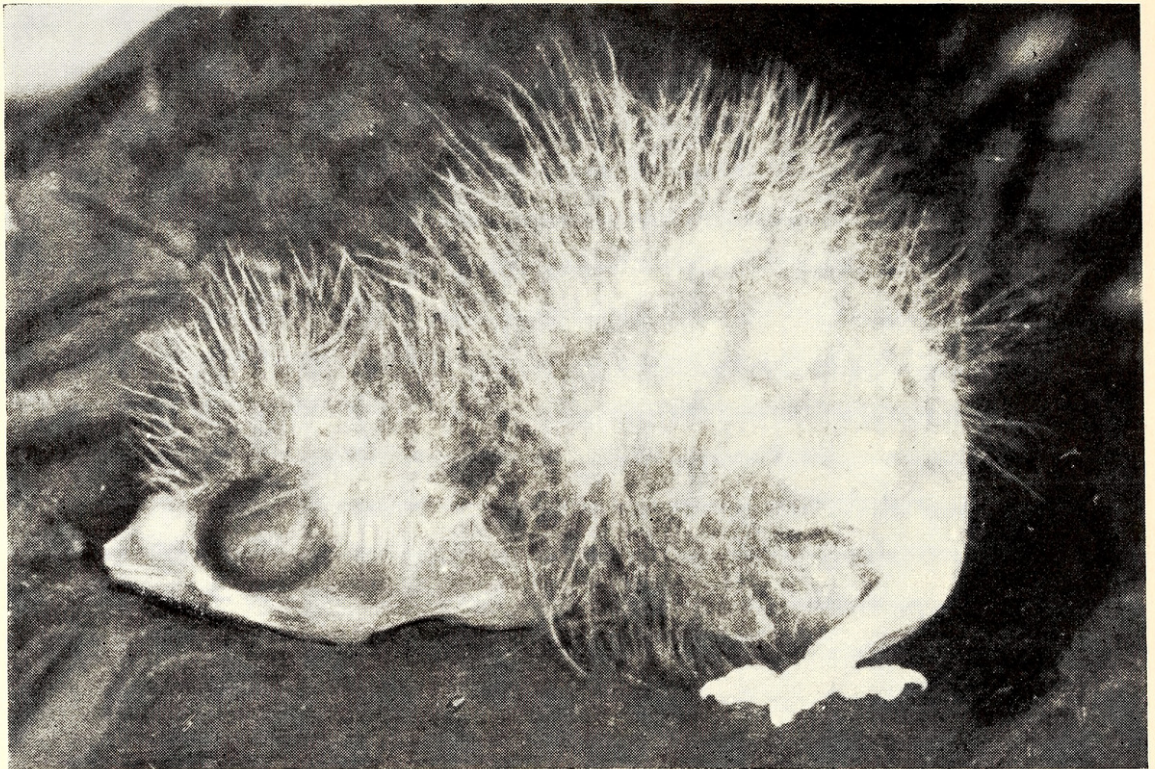
Dolgushin : Whitewinged Grosbeak



Above : Nest of the Whitewinged Grosbeak ; *Below* : Brood patch of a male (below) and of a female Whitewinged Grosbeak.

(Photos : E. Gavrilov)

Dolgushin : Whitewinged Grosbeak



Above : Downy chick of the Whitewinged Grosbeak 2-3 days old ; *Below* :
The female feeding her chicks.

(Photos : E. Gavrilov)

Both the female and the male feed their young (Plate IV, *below* & Plate V). Usually the chicks are fed by both parents together ; but sometimes the food may be brought only by the female, and sometimes only by the male. According to our observations, however, the main part in foraging for the chicks is taken by the male. This is due to the fact that the female has to stay with the nestlings for rather long periods. She stays in the nest in cold weather, when it rains, and also during very hot weather and strong insolation. During these periods the male brings the food, which is partly fed to the female, who in turn partly distributes it among the chicks. The food is also partly passed directly to the young by male. But when both parents feed the chicks together they distribute it uniformly among the brood.

The intervals between the visits of the parents with food to the nest vary : there may be from ten to thirty minutes between each visit, or sometimes it may take as much as one hour. Arriving birds alight on a bush three or four metres away from the nest and then approach it gradually, hopping from branch to branch ; usually the female is the first to approach. The parents feed their young throughout the hours of daylight ; they may cease feeding them only when severe weather sets in (strong wind, fog, snow, heavy rain, etc.).

The food is collected far from the nest, often more than one kilometre away, and it is never to be found nearer than a few hundred metres away. The juniper thickets are the birds' feeding site, and also where they collect the food for their chicks. The parents fly to the wood, perch on the tops of the bushes, and the female immediately disappears into their depth. The male stays for some time perching on the top of the bush looking around. After assuring himself that there is no danger he also disappears into the thickets, but from time-to-time he mounts to the top again to reassure himself of safety. All this time the female is in the thickets. Should there be any danger, the male warns the female by calling, and in case of imminent danger both birds flush out. However, the birds are not very shy, and often allow a man to approach them within five or six metres. It is usually impossible to see the birds in the depth of the thickets from this distance. They feed in silence, but the very characteristic cracking noise of the stones of the juniper fruits in their bills, which can be heard as far as 20 to 30 metres away, betrays their presence.

Once we observed that a female, after feeding her chicks, stood with her feet on the opposite rims of the nest, dipped into it and began to pull out the lining of the cup. She would take the individual pieces of juniper bast into her beak, chew them for some time, and then return them back into the nest. A few times she picked up something from the cup. It seemed as if she was trying to clean the nest of some parasites.

Faeces of the nestlings, are as a rule eaten by their parents, mostly by the female and very seldom by the male (Plate VI, *above*). When the chicks grow bigger and produce a great deal of faeces, the birds carry part of it out of the nest and drop it 30-40 m. away.

The nestling period was observed only in one case. On July 28 there were one nestling and three eggs in the nest ; on July 29 three nestlings and one egg ; on July 30 three nestlings and one slightly punctured egg (the chick may possibly have hatched the same afternoon) ; on July 31 four nestlings. On August 11 there were only three nestlings in the nest (the fourth evidently died), while on August 15 when we examined the nest, two nestlings had already flown. In this case the nestling period was about 17 or 18 days, though it appears that normally nestlings do not leave the nest until approximately 20 days old.

It is worth noting that when the nestlings leave their nests they can only flutter about in short flights in the depth of the thickets near their nests. It appears that difference in nestling period is due to their ability to make these short flights, and at the slightest danger they leave the nest.

Thus the complete nesting cycle, from commencement of nest-building until the nestlings start their independent life, takes at least one and a half months, or rather two months.

The first flying young birds were observed in the first half of June. On August 22 we saw a brood of Whitewinged Grosbeaks which had the wing-feathers still growing. The dates for the Talass Alatau Range may be somewhat later. On September 7, 1933, L. M. Shulpin found a bird which had just left the nest ; it had a very short tail, about one-third the normal size.

POST-NESTING PERIOD

After Whitewinged Grosbeaks leave the nest the broods still keep together for quite a long time. These broods undertake short flights in search of feeding sites. Some of them may moult as early as July, but most birds moult in August-September, completing it in October. According to the material in our collections we may infer the following about the change of the dress of this species. The hatched chicks are covered with down, which by the end of their nestling period changes into a juvenile plumage. This plumage may be kept for one or one and a half months. By the end of summer and in fall the juvenile Whitewinged Grosbeaks undergo a complete moult to their first year dress. Sexual dimorphism is not apparent in this plumage, and the young males look very much like the old females in colour. The adult dress is assumed by the young birds only after the first year is over, the moult taking place at the same time as in old birds, i.e. July-October. We have some evidence that yearling males in the 'female' dress are capable of repro-

ducing. Thus on July 10, 1965, from one pair we got a last-year male which had just commenced moulting into the adult plumage. Its skull had completely ossified, the brood patch was still bare, and the length of testes which had already commenced to reduce, was 4 mm. (the left one) and 2.5 mm.

Thus, the Whitewinged Grosbeaks put on the final dress during the second year of their life, moulting at the same time as adult birds in fall, and not in spring as had previously been assumed (Dementjev & Gladkov 1954).

After the breeding season is over, the Whitewinged Grosbeaks spend the greatest part of their time feeding in the juniper thickets. During this period we happened to observe a flock of birds roosting at night. In the evening, when it was already dark, a flock of 10 to 15 loudly calling Whitewinged Grosbeaks flew from somewhere above into the upper boundary of a spruce grove. They quickly perched by ones and twos on the tops of the spruces and being hidden in the dense crowns of the trees, at once became silent.

During snowfall, when in a number of places the juniper bushes become partly or completely covered with snow, redistribution of the Whitewinged Grosbeaks takes place. The majority of the birds concentrate on the southern exposures of the versants, where the snow depth is the least, while others descend to lower heights, into the zone of deciduous forests. Here they live among apple trees, dense thickets of roses, buckthorns and hawthorns. Only a few birds, and that not every year, may come down to the foothills. Sometimes they may be seen in the suburbs, and even in the city of Alma-Ata, about 600 m. above sea level. The birds have never been seen in the valley of the Ili River.

And yet, there are some places where the Whitewinged Grosbeaks undertake migrations over very long distances. In March of 1949, M. A. Koozmina several times saw flocks and groups of these birds on the southern versants of the Chulack range, while on December 26, 1965, Yu. N. Grachyov found a female example in the mountains of Anarhai. These zones are 150 to 200 kilometres away from the nearest nesting sites of the Whitewinged Grosbeak. Evidently these birds avoid flat areas, which are completely covered with snow in winter preferring to migrate to rugged ground, where there are always areas free of snow cover even in severe and snowy winters.

FECUNDITY

We have found 11 nests with completed clutches. In five nests (45%) there were three eggs each, in 6 nests (55%) 4 eggs each; average 3.54 eggs per nest. In five out of nine nests there were three hatched nestlings each, and in the remaining four nests, four nestlings each; thus



Dolgushin, I A, Gavrilov, E I, and Rodionov, E F. 1968. "The Biology of the Whitewinged Grosbeak *Mycerobas carnipes* in Kazakhstan Ussr Nesting." *The journal of the Bombay Natural History Society* 65, 105–119.

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