

AN ALBINO RUSTY DAB, LIMANDA FERRUGINEA, WITH NOTES
ON OTHER ABNORMALITIES IN FLATFISHES

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ONE TEXT FIGURE

This specimen was taken by a commercial fishing boat on November 18, 1944, in about 20 fathoms in the coastal waters somewhere between Block Island and Montauk Point. It was landed at Stonington, Connecticut, that afternoon and came into New York next morning in a large shipment of fishes consigned to Beekman Fillets Company, 214 Front Street. It is impossible to locate the boat that took the fish and the captain thereof, nor can the place of capture be more narrowly noted than above.

In sorting the fishes in the shipment, this albino dab came to light and was sent to Mr. Wm. C. Neville of the Fish and Wild Life Service, 155 John Street. He, being on the lookout for rarities for us, telephoned to ask if I would like to have this interesting specimen. The answer was a prompt affirmative, and a messenger was at once sent for it. To Mr. Neville and to Beekman Fillets Company, my best thanks are herewith tendered.

The specimen was received at about 4 p.m. and, when freed from the wrappings of damp cloths, was perhaps the most beautiful fish I have ever seen. The upper surface was as pure white as was, and is, the lower, but underneath the white was a lovely pink due to the fact that the whole complex of blood vessels was visible through this transparent veil of skin. All who saw this unique specimen were so interested and excited that no one noted whether or not the eyes were pink. By the time everyone had looked the fish over, it was too late to have it photographed. So it was laid on a piece of smooth board and wrapped carefully in cloths, to prevent warping or twisting while immersed in alcohol over night. Next morning it was photographed as may be seen in Figure 1.

Press of other work has postponed the description of this specimen until now. At this writing, after nearly four months in alcohol, the fish measures 10 inches in standard length and 12 over all. The body is 4.4 inches wide between bases of median fins. The weight today is 6 ounces. This is a small specimen. In our waters it is known to reach 21.75 inches in length.

The rusty dab, like the other flatfishes, is an abnormal fish when comparison is made with all other fishes. But, as a member of the order Heterosomata or Flatfishes, it is entirely normal. Paradoxically it is a normally abnormal fish.

When a flatfish is very young it swims like any other fishlet with its dorsoventral axis vertical, and it has an eye on each side of its head. It is a normal little fish, and if it continued to swim vertically each side would develop color alike. But it shortly lies down on one side and is notable for a lack of coloration

on that side. The side it lies on is very definitely fixed for certain genera of flatfishes—in *Limanda* it is the left side. Indeed only one reversed *Limanda* seems ever to have been recorded (by Duhamel du Monceau in 1777). And as our little fish takes on this prone position in life, the color develops on the right side, the eye of the left side migrates across the forehead and comes to rest on the right, upper, or colored side. The lower side, having lost its eye, also fails to develop any color. Our dab has become a normal flatfish, but is fundamentally an abnormal fish.

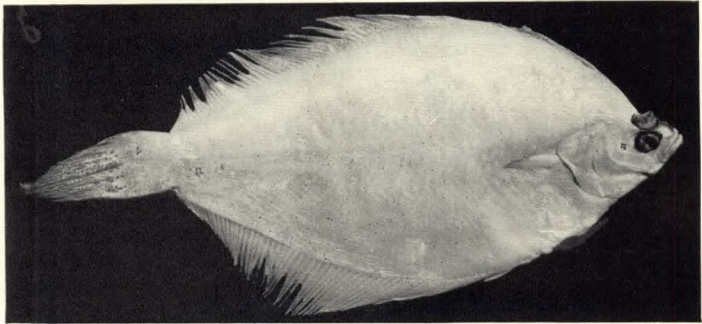


FIGURE 1. AN ALBINO RUSTY DAB, *LIMANDA FERRUGINEA*, TAKEN OFF BLOCK ISLAND
NOVEMBER 18, 1944

HOW VARIOUS ABNORMALITIES MAY ARISE IN FLATFISHES

In growing up there are a number of ways in which our little fish could, from the standpoint of his tribe, have become abnormal.

(1) Due to lie on its left side with its head pointing to the right as is usual for *Limandas*, it might have settled down on its right side with its head pointing to the left. Whereupon the left side would have developed color and the right eye would have migrated to this left side, while the right side would have become blind and colorless. Such a flatfish is labelled reversed, i.e., the sides have been "swapped" and the head points in the wrong direction. Such a left-pointing dab would be reversed and would be an abnormal dab.

(2) The next abnormality has to do with the eye. The little fish settles down on its left side, as is the rule for dabs, and the left eye begins its migration to the upper side of the head. But if it stops on the middorsal line of the head, or sometimes if it gets barely across it so that, holding the little dab up blind side to one's eye, one can see the eye just across the dorsal ridge, there will generally be an overhanging hook formed of the bases of the anterior fin rays. Here is a remarkable abnormality—which, however, is almost always, if not surely, tied up with abnormal coloration on the underside.

Now we come to that abnormality of which there are four varieties—coloration. With the little dab resposing normally on its left side, it may go wrong in two degrees in its coloration of each side.

(3A) It may develop few or many separate patches of color on its under, white, or blind side. Such an abnormal fish is denominated partially ambicolorate, partially colored below as it is above. Such a dab is abnormal.

(3B) If, however, our dab goes on to develop total coloration on the under side, it becomes a totally ambicolorate dab, with both sides colored alike, eye generally totally or partially rotated across the forehead, and with an overhanging hook. Such a flatfish is about as abnormal, as grotesque, as these normally abnormal flatfishes can become.

Even now our little dab has still left two ways of becoming abnormal. Lying on its left and colorless side, with the left eye safely and normally emplaced on the upper or right side, it may still take one of two wrong paths.

(3C) It may develop white areas about on its normally dark upper side. Such a dab will be called a piebald or a partial albino. There are varying degrees or stages of partial albinism ranging up to the next deformity.

(3D) The dab may fail to develop any color on the upper side and become a total albino. Total or perfect albino dabs or other flatfishes are probably rather rare, as are total ambicolorates, called "black bellies." The intermediate stages of partial ambicoloration and of albinism in flatfishes are fairly common.

When our little dab came, it seemed to be a perfect albino, but close examination of the upper surface brought to notice certain slight discolorations, which were at first thought to be bits of dirt. But closer examination revealed these as "token" rusty spots of the normal coloration. There is one behind the right eye, and a bit of dark tissue shows at the edge of the operculum. On the hinder part of the body are faint discolorations. Such areas are stronger on the bases of the caudal rays and more distinct on the hinder half of the caudal fin. Then some of the tips of the hinder dorsal and anal rays are a bit dark. Possibly these "token" darkenings are accentuated by the solvent action of the alcohol on the oils in the skin. These small discolorations forbid the calling of this fish a perfect albino, but it certainly is an excellent example of an albino dab.

Most noticeable is a dark bar extending from the front of the left or rotated eye forward to the middle point of the upper jaw. This apparently is more or less common for albino dabs. Such is portrayed (more accentuated) in an albino *Limanda limanda* in Figure 16 of the late J. R. Norman's great "Monograph of the Flatfishes (Heterosomata)," London, 1934, p. 23.

Despite these small discrepancies, our little fish is a beautiful specimen of an albino rusty dab. Ambicoloration in varying degrees is not uncommon among dabs. In his "Monograph" (p. 23), Norman says that of 51 ambicolorate flatfishes of 6 groups examined by him 9 specimens were dabs. Total albinos (or total white ambicolorates) among flatfishes are rare since, like our specimen, "Even in the more completely albino examples there is nearly always some pigment on the head on the ocular side, generally extending from the tip of the snout backwards to about the region of the preoperculum, and complete absence of pigment on this surface is very rare indeed." Albino fishes are "sports" and, according to Norman, "The percentage is perhaps higher in the Heterosomata [Flatfishes] than in any other group of fishes." Flatfishes being ab-

normal to begin with, albinism seems to come more easily for them than for forms ordinarily normal.

With regard to the cause of albinism in flatfishes, I can do no better than to refer the reader to Norman, who in the general part of his "Monograph", devoted 7 pages to a section on "Albinism, Ambicoloration and Reversal." He states that the literature dealing with the abnormalities of coloration of flatfishes is an extensive one. Then in addition to the references in the general part of his book, he refers specifically to 15 articles by 12 men, and says that these should be particularly consulted with reference to these abnormal coloration phenomena in flatfishes. But he does not review these theories of albinism, nor does he set forth one of his own. If Norman, in the greatest work ever published on the flatfishes, keeps silent as to the reputed causes of albinism in such fishes, I think that I can safely follow his example.