

Criteria for Identification of Tekhelet and the Hillazon

Property	Talmudic Description	Physical Evidence
Habitat	<i>Tzaydei hillazon</i> - the fishers of <i>hillazon</i> are from Haifa to Tzur (Tyre). (Shabbat 26a).	Archeological digs show remnants of the dyeing industry on the Northern coast of Israel through the southern coast of Lebanon. (Royal Purple, p.149-157; Serman, p.64). Digs near Haifa and Tyre and beyond, revealed mounds of <i>Murex</i> shells (broken to access their dye stuff) - some up to one hundred yards long and several yards thick. (Royal Purple, p.24, p.151-5; Ziderman, p.438; Twerski, p.82).
Shell	<i>Potzeia</i> - One who breaks open a <i>hillazon</i> violates Shabbat. (Shabbat 75a). Go and learn [about the clothes of the Jews in the desert] from the <i>hillazon</i> , all the time that it grows, its shell (<i>nartiko</i>) grows with it (Shir HaShirim R. 4:11).	The <i>Murex</i> snail is a hard shelled Mollusk, which must be broken open to obtain the dye stuff. (Ziderman, p.430). The shells found in the archeological digs were broken in the exact spot necessary to obtain the dyestuff. (Ziderman, p.438). R. Herzog explains the use of the verb <i>potzea</i> to mean “break open” - as in a nut (Ziderman, p.430).
Dye Extraction	One is more pleased that it should be alive, so that the “blood” should be clearer (Shabbat 75a) - the “blood” from the live [<i>hillazon</i>] is better than from it dead. (Rashi on <i>ibid.</i>)	Inside the hypobranchial gland of the snail, only the precursors to the dye exist as clear liquid. (Serman, p.76). The chemistry of the dye formation in the <i>Murex</i> requires a specific enzyme (purpurase), which quickly deteriorates upon the snail’s demise. (Serman, p.68).
Reproduction	<i>Briato</i> - Its creation is similar to that of a fish. (Men. 44b).	<i>Murex</i> snails are spawned from eggs, just like fish. (Twerski, p.98).
Body Color	The body of the <i>hillazon</i> is like the sea. (Men. 44a).	The snail shell takes on a blue-green color due to the sea fouling organisms covering them. In any case, the shell is always the same color as the sea bed in which it is found. (Serman, p.69).-Biblical and Talmudic references to “sea” often refer to “sea-bed” (e.g. Yishaya 11:9). (Rock, p.15). It is a more than reasonable assumption that the Gemara is referring to the shell as it looks when it is caught (and not after it has been polished). (Ziderman, p.430).
Dye Color	<i>Tekhelet</i> resembles the color of the sea, and the sea the sky... (Men. 43b). God said: I have distinguished in Egypt between the drop of [semen that was to become] a firstborn and that of a non-firstborn, I will exact retribution from he who attaches <i>kela ilan</i> to his cloth and claims it is <i>tekhelet</i> (Baba Metzia 61b).	<i>Kela Ilan</i> has consistently been identified as indigo (Aruch), which is blue. The blue dye obtained from the <i>Murex trunculus</i> snail is molecularly equivalent to the dye obtained from the <i>Kela ilan</i> plant. (Royal Purple, p.175; Serman, p.66)
Dye Quality	<i>Lo ifrad hazutei</i> - If its color is permanent then its valid (Men. 43a) - its dyeing is well known for its steadfast beauty and does not change (Rambam, <i>Hil Tzitzit</i> 2:1).	The <i>Murex</i> dye binds very tightly to wool, and is among the fastest of dyes known to the ancient world. (Serman, p.67). 3 days in strong bleach has no effect. (Twerski, p.91).
Mannerism	“Treasures buried in the sands” (Dev. 33:19) refers to the <i>hillazon</i> . (Megilla 6a).	<i>Murex trunculus</i> burrows into the sands and sediment on the sea floor. (Royal Purple, p.181, p.190; Ziderman, p.429; Twerski, p.85).
Name	Raavya quotes the Yerushalmi identifying <i>tekhelet</i> with the Greek word porphyra.	Porphyra is the Greek word used to refer to <i>Murex</i> snails. (Serman, p.68).

Sources:

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