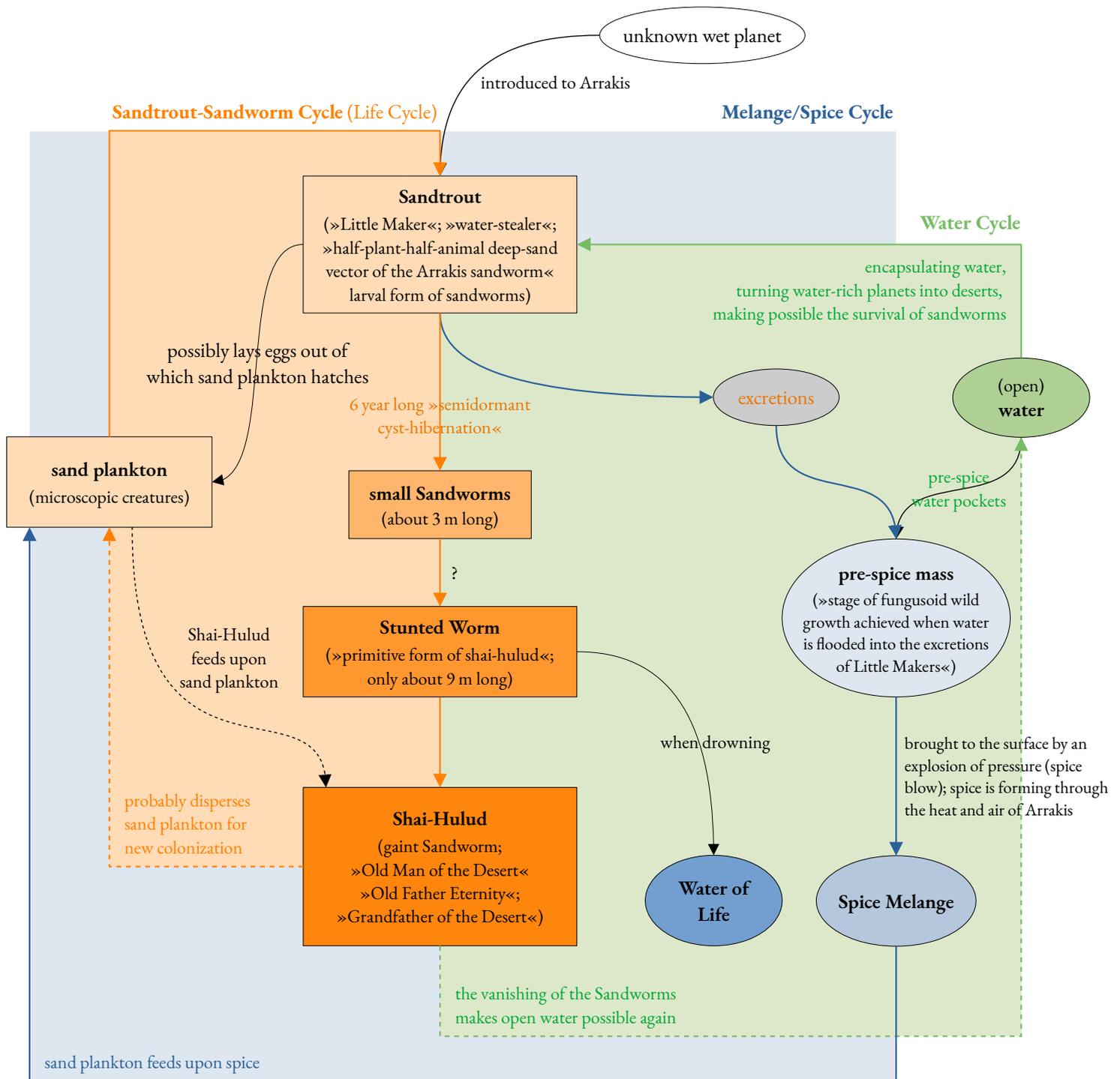


Frank Herbert: Dune Universe

Ecological cycle(s) – Sandworm-Sandtrout, Spice, Water



Shai-Hulud	small = 110 × 22 m medium = 200 m very large = > 400 m biggest = > 750–2.340 m (»more than half a league long«)
stunted worm	9 m
small Sandworms	3 m
Sandtrout	presumably. 0,2–0,3 m
sand plankton	microscopic

»Kynes set his newly trained Fremen limnologists to work: their chief clue, leathery scraps of matter sometimes found with the spice-mass after a blow. This had been ascribed to a fictional >sandtrout< in Fremen folk stories. As facts grew into evidence, a creature emerged to explain these leathery scraps – a sandswimmer that blocked off water into fertile pockets within the porous lower strata below the 280° (absolute) line.

This >water-stealer< died by the millions in each spice-blow. A five-degree change in temperature could kill it. The few survivors entered a semidormant cyst-hibernation to emerge in six years as small (about three meters long) sandworms. Of these, only a few avoided their larger brothers and pre-spice water pockets to emerge into maturity as the giant shai-hulud. (Water is poisonous to shai-hulud as the Fremen had long known from drowning the rare >stunted worm< of the Minor Erg to produce the awareness-spectrum narcotic they call Water of Life. The >stunted worm< is a primitive form of shai-hulud that reaches a length of only about nine meters.)

Now they had the circular relationship: little maker to pre-spice mass; little maker to shai-hulud; shai-hulud to scatter the spice upon which fed microscopic creatures called sand plankton; the sand plankton, food for shai-hulud, growing, burrowing, becoming little makers.«

(Herbert: Dune, Appendix I: The Ecology of Dune)

»*Pre-Spice Mass*: the stage of fungusoid wild growth achieved when water is flooded into the excretions of Little Makers. At this stage, the spice of Arrakis forms a characteristic "blow," exchanging the material from deep underground for the matter on the surface above it. This mass, after exposure to sun and air, becomes melange (See also Melange and Water of Life.)

Shai-Hulud: Sandworm of Arrakis, the >Old Man of the Desert,< >Old Father Eternity,< and >Grandfather of the Desert.< Significantly, this name, when referred to in a certain tone or written with capital letters, designates the earth deity of Fremen hearth superstitions. Sandworms grow to enormous size (specimens longer than 400 meters have been seen in the deep desert) and live to great age unless slain by one of their fellows or drowned in water, which is poisonous to them. Most of the sand on Arrakis is credited to sandworm action.«

(Herbert: Dune, Appendix IV: Terminology of the Imperium)

»Beneath him, its distance foreshortened by darkness, an open stretch of qanat gleamed in moonlight; its surface rippled with movements of predator fish which Fremen always planted in their stored water to keep out the sandtrout.

>I stand between fish and worm,< he murmured.

>What?<

He repeated it louder.

[...]

Leto shuddered. Memories which fastened him to places his flesh had never known presented him with answers to questions he had not asked. He saw relationships and unfolding events against a gigantic inner screen. The sandworm of Dune would not cross water; water poisoned it. Yet water had been known here in prehistoric times. White gypsum pans attested to bygone lakes and seas. Wells, deep-drilled, found water which sandtrout sealed off. As clearly as if he'd witnessed the events, he saw what had happened on this planet and it filled him with foreboding for the cataclysmic changes which human intervention was bringing.

His voice barely above a whisper, he said: >I know what happened, Ghanima.<

She bent close to him. >Yes?<

>The sandtrout ...<

He fell silent and she wondered why he kept referring to the haploid phase of the planet's giant sandworm, but she dared not prod him.

>The sandtrout,< he repeated, >was introduced here from some other place. This was a wet planet then. They proliferated beyond the capability of existing ecosystems to deal with them. Sandtrout encysted the available free water, made this a desert planet ... and they did it to survive. In a planet sufficiently dry, they could move to their sandworm phase.<

>The sandtrout?< She shook her head, not doubting him, but unwilling to search those depths where he gathered such information. And she thought: Sandtrout? Many times in this flesh and other had she played the childhood game, poling for sandtrout, teasing them into a thin glove membrane before taking them to the deathstill for their water. It was difficult to think of this mindless little creature as a shaper of enormous events.

Leto nodded to himself. Fremen had always known to plant predator fish in their water cisterns. The haploid sandtrout actively resisted great accumulations of water near the planet's surface; predators swam in that qanat below him. Their sandworm vector could handle small amounts of water – the amounts held in cellular bondage by human flesh, for example. But confronted by large bodies of water, their chemical factories went wild, exploded in the death-transformation which produced the dangerous melange concentrate, the ultimate awareness drug employed in a diluted fraction for the sietch orgy. That pure concentrate had taken Paul Muad'Dib through the walls of Time, deep into the well of dissolution which no other male had ever dared.

Ghanima sensed her brother trembling where he sat in front of her. >What have you done?< she demanded.

But he would not leave his own train of revelation. >Fewer sandtrout – the ecological transformation of the planet ...<

>They resist it, of course,< she said, and now she began to understand the fear in his voice, drawn into this thing against her will.

>When the sandtrout go, so do all the worms,< he said. >The tribes must be warned.<

>No more spice,< she said.«

(Herbert: Children of Dune)

Sources (besides Herbert's books):

- Hechtel, Sibylle: The Biology of the Sandworm, in: Grazier, Kevin Robert (Ed.): The Science of Dune. Unauthorized exploration into the real science behind Frank Herbert's fictional universe, BenBella Books: Dallas (TX) 2008, 29–47.