

NEOBIČNI METAMORFOZNI PARADOKS ČEŠNJARKE (*Pelobates fuscus*)

Žaba češnjarka je tajnovita životinja i vrlo rijetka vrsta vodozemaca u Bosni i Hercegovini. Živi **fosforijalno**; danju se zakopava u zemlju, a na površinu izlazi noću i to samo kada je vlažno. Kožne žlijezde u situaciji opasnosti izlučuju obrambenu tekućinu koja **miriše na bijeli luk**, zbog čega je i nazivamo češnjarka.

Jedinstvena osobina češnjarke je **neobična promjena veličine tijela** tokom metamorfoze. Punoglavci postaju ekstremno veliki i mogu narasti čak i do 20 cm dužine. Na kraju samog procesa, larve se preobražuju u tek nekoliko centimetara duge žabice...



Češnjarke izgledom podsjećaju na žabe kraslače. Tijelo im je zdepasto i okruglo, glava krupna sa **vertikalnim zjenicama**. Zadnji ekstremiteti su kratki sa **ostrugama za ukopavanje** i plovnim kožicama razapetim između prstiju koje služe za plivanje.

Odrasle jedinke se hrane kopnenim beskličmenjacima poput mrava, skakavaca, paukova, puževa, raznih tvrdokilica i gusjenica, a pošto su se prilagodili životu na poljoprivrednim zemljištima ispostavilo se da su dobri istrebljivači štetnih i invazivnih insekata.

DRASTIČNE PROMJENE U KRATKOM VREMENSKOM PERIODU

Tokom metamorfoze dolazi do velikih promjena u tijelu jer se način života žabe sasvim mijenja, a sve može dostići u toku samo jednog dana:

- 1) Spiralna usta reapsorbiraju se zajedno sa ciljevima.
- 2) Razvija se velika čeljust, a škrge nestaju.
- 3) Oči i noge brzo rastu i formira se jezik.
- 4) Dolazi do promjena u nervnom sistemu, kao što je razvoj stereoskopskog vida i reapsorpcija se senzitivnog organa - bočna linija (prisutne kod riba).
- 5) Nekoliko dana kasnije reapsorbira se rep, kontroliranim izumiranjem ćelija (apoptoza).



Punoglavci imaju hrskavičav skelet, škrge za disanje (samo vanjske pa onda unutrašnje), bočnu liniju i velik rep pomoću kojeg plivaju. Tek izleženi punoglavci ubrzo dobiju vrećice koje pokrivaju škrge.

PUNOGLAVAC NA VRHU LANCA ISHRENE ?

Punoglavci su obično biljojedi i pretežno se hrane algama, uključujući i silikatne alge koje škragama filtriraju iz vode. Također su i detritivori, što znači da kopaju sedimente na dnu bare i unose jestive tvari. Imaju relativno duga i spiralna crijeva koja im omogućavaju lakvu ishranu. Punoglavci češnjarke su dodatno i karnivori te se hrane insektima, manjim punoglavcima, ribama, te često postaju kanibali.

Punoglavci već prve godine mogu doseći veličinu od oko 10 cm i više, a ukoliko prezime (nepovoljni uslovi) ludeće sezone mogu narasti i do 20 cm!

OD JAJETA DO ŽABE: BORBA ZA ŽIVOT

Ženka češnjarke položi do 3000 jaja u debelim vrpčama omotanima oko vodene vegetacije, a iz njih se razvijaju punoglavci, prilagođeni životu u vodi.

Jaje vodozemca obavlja providan želatinozni pokrivač izlučen iz jajovoda. Ta kapsula propušta vodu i gasove i znatno se napuše kada apsorbira vodu.

Jajašce se isprva čvrsto drži na jednom mjestu, a zatim se unutrašnji sloj rastopi, što embriju omogućava slobodno kretanje.

Jaja sadrže pigment melanin, koji apsorpcijom svjetlosti povećava temperaturu i štiti ih od UV zračenja.

Nakon izvaljivanja iz jaja punoglavci su nepokretni, nerazvijena usta i hranu crpe iz žumančane kese. U samo nekoliko dana rep ojačava, stvaraju se usta te punoglavci polaze u aktivnu potragu za hranom.

Mnoga jaja propadaju zbog **gričevnih oboljenja**, te su kontinuirano izloženi napadima mnogih predatora što **POVEĆAVA SMRTNOST**. Jaja sadrže **jednolijske zelene alge** koje pradiu kroz želatinozni pokrivač i fotosintezom povećavaju količinu kisika za embrij što ubrzava razvoj punoglavaca i **SMANJUJE SMRTNOST**.

Ilustracija: Damir Bakija

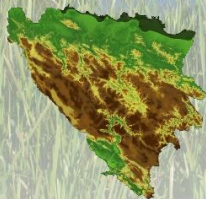
Figure 1: Educational Rollup regarding
Ontogenetic development of European
common spadefoot toad

Conservation of Complex Aquatic and Terrestrial Habitats Preferred by Extreme Ontogenetic Shapeshifter:

European Common Spadefoot Toad (*Pelobates fuscus*)

until recently it was **rare and secretive species** for Bosnia and Herzegovina. After project activities in period of 2014 – 2016 were finished, this species population distribution data in Bosnia and Herzegovina is more than clear. Common spadefoot toad is wide spread species in lowland and hilly areas of central, eastern and south-eastern Europe.

In Bosnia and Herzegovina the species can be found along the whole Posavina region (from Kostajnica to Bijeljina), on appropriate habitats.



Vulnerability

After all research done so far in Bosnia and Herzegovina, we have noticed that species has adapted well to anthropogenic habitats, but the largest populations can still be found around natural water habitats. Other risk factors which affect common spadefoot in B&H are: mechanical plowing of agricultural land, road kills, water pollution, fish introduction in water habitats (especially predatory species).

Habitat

Two main types of habitats that are populated with common spadefoot toad are ridden soil and water habitats. Natural terrestrial habitats are sand soils around bodies of water, but species adapted well to life on cultivable lands.

Water habitats are mainly shallow, standing or slow moving waters, good or medium quality with large amounts of water vegetation. Typical natural habitats are puddles, ponds and event aggregation channels to which they have adapted due to lack of natural habitats.



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European common spadefoot toad

Looks like many other toads with round body and head with big eyes on the side of the head and vertical pupils (1).

Hind legs are short with metatarsal tubercles and webbed toes that are mainly used for swimming (2).

Ventral belly side is stained white colored with the exception of juvenile individuals whose belly is white colored in the beginning.

Dorsal back side varies in color, and besides main pattern which is dark brown, individuals can be yellowish, brownish, grayish and olive greenish colored with red dots of different intensity.

Females are usually gray and males yellow-brownish with prominent oval gland (3) on front limbs.

Main aims of the II part of the project:

1. Determination of population age structure
2. Water quality testing – sites where tadpoles are found present
3. Tadpole survey – ethology, ecology, morphometry, meristics and morphology
4. Finding possible new sites and checking for unreliable literature data for more detailed distribution map in B&H
5. Continuation of taking morphometric measurements of adult and subadult individuals
6. Comparative monitoring of ecological and biological habitat factors
7. Promo movie



spadefoot toad tadpole

After hatching, tadpoles are immobile, not having developed oral cavity and still depending on food from egg sack which is situated on ventral belly side. After only several days their tail starts to develop and it gets stronger, oral disc develops and they start the active tadpole phase (swimming and searching for food). They prefer shallow water bodies with a lot of water vegetation. They mainly feed on algae and plants, as well as protozoans, invertebrates and other amphibian larvae. They have only several months until full metamorphosis. Mostly they will go through metamorphosis during the same season, but in case of bad season conditions (lack of food, bad weather, etc.) they will endure winter and continue their development the following spring. During their second year they can **grow up to 20 cm!** In the process of metamorphosis, common spadefoot toads stop feeding and they use extra energy by reabsorbing their tail, which shrinks and disappears at the end of the process. Common spadefoot toad tadpoles are easily recognized from other tadpoles by their size and eye bulbs position on the sides of the head.

Figure 2: Educational leaflets (in English language)



Figure 3: European common spadefoot toad promotional material (t-shirts, pencils, stickers, eco bags)