

Znanstvena metoda (Znanstveni postupak)

Hipoteza – ograničena izjava spram uzročno posljedičnih odnosa promatranog događaja u određenim okolnostima temeljena na prethodnom (prije pokusa) znanju
‘ponuđeni odgovor koji se može dokazati - pokusom’

Teorija – hipoteza ili više njih koje su potvrđene višekratnim ispitivanjem/pokusima



Prirodna selekcija može djelovati samo putem očuvanja i nakupljanja beskrajno malih nasljednih promjena...

natura non facit salta

Shematski prikaz glavnih koraka znanstvene metode

OPAZITE i odredite pitanje (ili problem)

Prikupite informacije o predmetu istraže.
Čitajte!

Oblikujte hipotezu kojom se moguće
objasnjava problem

Pokusom/mjerenjem provjerite hipotezu
(na ponovljiv način)

Analizirajte prikupljene podatke

Interpretirajte podatke i izvedite
zaključke

Objavite rezultate
(odgovor na pitanje iz prve kućice)

Ponovno provjeravanje
(drugi znanstvenici)

Problem - zašto trava ne raste jednoliko?

**Opazite razlike između normalnog travnjaka i zakržljalog
npr. u blizini raste crnogorično stablo
što to znači travi???**

Što znamo (o utjecaju crnogoričnog stabla na okoliš)?

- 1. stvara sjenu,**
- 2. rashlađuje područje,**
- 3. zakiseljuje tlo,**
- 4. smanjuje evaporaciju**

Hipoteza???



Hipoteza:

Sniženi pH uzrokuje slabiji rast trave

Pokus: ???

Ista: zemlja, broj sjemenki, voda...

Promjenjiv: pH (2, 4, 6, 8, 10, 12)

Rezultati i njihova analiza:

2 i 4 - nema trave,

6 - slabo,

8 i 10 - izvrsno,

12 - slabo

Nova hipoteza: ???

Raspon pH do 6 i iznad 11
uzrokuju slabiji rast trave

Novi pokus



Seminarski zadatak:

Na sličnom principu pripremiti pokus s očekivanim rezultatima

Mora sadržavati:

Opažanje fenomena koji učenik može vidjeti u svom okolišu i koji će ga po Vašem mišljenju zainteresirati

Postavljanje hipoteze i iz nje adekvatnog pokusa

Simuliranje rezultata (ne morate izvesti pokus, ali i možete)

Objašnjenje rezultata

Cheating is a hell of a lot worse than being stupid.



Plagiarism is an academic crime. It is punishable by academic death.

Hipoteze ?



Znanstveni rad (djelovanje)



Siltation disturbance in a mountain stream: aspect of functional composition of the benthic community

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Key words: fine sediment stress, FRG,
benthos, macroinvertebrates, quarrying,
mining, Croatia

Abstract

Background and Purpose: Siltation is a recognized stress for the benthic community. It may cause changes in the structure of habitat substrate, water chemistry and food resources. The aim of this study was to examine the effects of siltation on the frequency of appearance of species from community, in respect to availability of food resources.

Materials and Methods: The study was carried out at Rastva Stream, the Moravice River basin, Croatia, disturbed by quarrying.

Results and Conclusions: Turbidity, pH and temperature increased significantly downstream of the quarry (Quinn et al. 1992).

Bottom sediments were disturbed and the water became turbid and warmer.

The intensity of disturbance is indicated by amount of suspended particles in water (T), which increases downstream of the quarry (Table 2).

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‘Znanstveni rad’

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Znanstveni članak (djelo)



‘Najčešća i najlakše ispravljiva pogreška autora je da prepostave da njihova publika zna više.’

**Leslie Sage
Senior Editor, Nature**

‘Izbjegavajte žargon, objasnite nejasne pojmove i kratice. Imajte na umu da mnogi čitatelji nisu stručnjaci u Vašem području.’

**“Instructions to Authors”
Science**

Kako do šire publike?

- 1. Koristite konkretnе primjere,**
- 2. Dajte kratka objašnjenja i definicije,**
- 3. Koristite jednostavan umjesto stručnog jezika (žargona)**



Primjeri:

In aquatic habitats of karst regions (carbonate based geological substrate) a phenomenon of calcite deposition may occur. In temperate zones and non-thermal (flowing) waters the deposit that forms is called tufa. It is a porous calcium carbonate deposit that develops in carbonate-supersaturated waters (Chafetz and Folk, 1984), where calcite crystals are deposited on immersed objects including organisms such as algae and mosses and animal-originating structures

Furthermore, some quarries utilize water in the exploitation process and are situated near natural water supplies that could be affected. Diabase (used for asphalt mixture) quarries are a typical example.

An accurate understanding of the spatial relationships between the structures of the head is essential for anthropological methods concerned with the comparison of faces to skulls (superimposition) or the prediction of faces from them (facial approximation).

Loš je članak lako napisati, i uglavnom, loš članak će biti *dulji* od dobrog. Da biste napisali dobar članak morate pažljivo odabrati što želite postići: koju VAŽNU PORUKU želite da čitatelji dobiju Vašim člankom. Kad to riješite, lakše je **USREDOTOČENO pisati.**

**Leslie Sage
Urednik *Naturea***

Stilovi prenošenja biti poruke



Tko, što, kad,
gdje, zašto
i kako



Problem
↓
Rješenje
(Elevator speech)

Tema i važnost
Koju prazninu popunjavate
(posterska prezentacija)



?

Vodič za prenošenje biti poruke

1. Što je **tema** i zašto je vrijedna istraživanja
2. Kako **vaše istraživanje** unaprjeđuje znanje o temi
3. **Ključni** podaci o (metodama i) rezultatima
4. Kako se vaše istraživanje stavlja u kontekst teme, kako otvara nova pitanja?

Several studies to identify medicinaly important plants have been conducted in Northern and Western Europe. Here we conduct such a study in Southeast Europe...

Kako biste vi poboljšali ovaj tekst?

Many plant-cataloguing studies have been conducted in Northern and Western Europe, but these have uncovered less than 5% of the suspected diversity of medicinal plants. Here we conduct a similar study in Croatia, Bulgaria, Greece and Albania to identify [...] the region has been known for its endemism [...]



Uvriježena podjela poglavlja zČ

Naslov

Autori

Sažetak

Ključne riječi

Uvod

Materijal(i) i metode

Rezultati

Rasprava

(Zaključak)

(Zahvala)

Izvori

Prilozi:

Slike

Tablice