Bring the surgeon's knife to your work!

CREADUCATE CONSULTING

Every bit of your scientific project is dear to you. But not to your audience. The more you "go on and on", the greater the risk that your audience will get tired and confused and fall off your path. Less is more. We can help you make the most of every single word in your communication, and give you the confidence to *leave out* what's unnecessary and distracting.

Here are some examples of how we can edit texts to make them shorter, clearer and more convincing.

EXAMPLE 1: A short extract

Original (42 words)
Phosphate is needed by any living cell for structural and metabolic purposes. In the same way, living cells require adequate concentrations of numerous metals and minerals. Pi has to be actively transported across the cell membrane against a chemical and electrical gradient.

Revised (27 words, 36% reduction)
All living cells require phosphate for structural and metabolic purposes. Inorganic phosphate (Pi) must be actively transported across the cell membrane against a chemical and electrical gradient.

EXAMPLE 2: Introduction from a paper in insect biology (*Egyptian J Biol Pest Control* 28:95, 2018)

Original (349 words)
The greater wax moth (GWM), Galleria mellonella L. (Lepidoptera: Pyralidae), is one of the most devastating and economically important pests of bee wax in the world (Haewoon et al. 1995). The larvae of the wax moth cause considerable damage to combs left unattended by bees. Combs in weak or dead colonies and in storage areas are subject to attack (Caron 1992). Chemical pesticides have been the practical method used by growers for the control of economically insect pests, but their negative side-effects on non-target organisms, groundwater contamination, residues on food crops, and the development of insect resistance to chemicals have forced the industry and scientists to focus on developing alternative control measures. This pest species has received more attention as a model organism for toxicological investigations involving entomopathogens than as a honeybee pest, with more focus on proven (demonstrated) control measures (Ramarao et al. 2012). Even though evidence for a successful and sustainable biological control agent of GWM is still lacking, previous researchers have explored various biological agents and bio-products, including Bacillus thuringiensis Berliner (H-serotypeV) (Bt), Bracon hebetor (Say), Trichogramma species, the red imported fire ant (RIFA) (Solenopsis invicta Buren and Solenopsis germinita Fabricius), and the use of the male sterile technique (MST). The EPF are the most important ones among all the microbial biocontrol agents (MBCAs) due to their broad host range and route of pathogenicity. Studies of Jafari et al. (2010) revealed that male sterilization was most effective when the wax moth pupae were partially sterilized (using 350 Gy of gamma radiation). However, the release of irradiated pupae ended prematurely because the pupae were fragile and required a high input cost. In an effort to substitute irradiated pupae, irradiated eggs were released, but a similar experiment has never been performed on wax moths. In addition, Bloem et al. (2005) showed that the emerging larvae were more destructive, raising fears that use of irradiated F1 eggs of GWM could exacerbate economic losses.

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The aim of the present study was to evaluate the effect of the gamma irradiation and/or EPF, separately or combined in controlling G. mellonella under laboratory conditions.

Revised (241 words, 31% shorter)

The greater wax moth (GWM), Galleria mellonella L. (Lepidoptera: Pyralidae), is one of the most devastating and economically important pests of bee wax in the world (Haewoon et al. 1995). Combs in weak or dead colonies and in storage areas are subject to attack (Caron 1992).

Chemical pesticides have been the practical method used by growers for the control of economically insect pests, but they have negative side-effects on non-target organisms, contaminate groundwater, leave residues on food crops, and trigger chemical resistance in insects. This has led researchers and the agricultural industry to focus on developing sustainable biological control measures, including entomopathogenic fungi (EPF) (Ramarao et al. 2012), Bacillus thuringiensis Berliner (H-serotypeV) (Bt), Bracon hebetor (Say), Trichogramma species, the red imported fire ant (RIFA) (Solenopsis invicta Buren and Solenopsis germinita Fabricius), and male sterilization. EPF are highly promising because of their broad host range and route of pathogenicity.

Male sterilization is also promising but at least one study found that irradiation of wax moth pupae was costly and left the pupae too fragile (Jafari et al. 2010). An alternative sterilization approach may be to irradiate eggs, but to our knowledge this has not been examined in wax moths and in at least one study suggested that irradiation made moth larvae even more destructive (Bloem et al. 2005).

Here we explored the possibility of using gamma irradiation of G. mellonella eggs (?) and/or EPF against G. mellonella to control GWM under laboratory conditions.

EXAMPLE 3: An abstract in cell biology [*PLoS Genet* 10(9): e1004607]

Original (298 words)

Chromosome segregation errors in human oocytes are the leading cause of birth defects, and the risk of aneuploid pregnancy increases dramatically as women age. Accurate segregation demands that sister chromatid cohesion remain intact for decades in human oocytes, and gradual loss of the original cohesive linkages established in fetal oocytes is proposed to be a major cause of age-dependent segregation errors. Here we demonstrate that maintenance of meiotic cohesion in Drosophila oocytes during prophase I requires an active rejuvenation program, and provide mechanistic insight into the molecular events that underlie rejuvenation. Gal4/UAS inducible knockdown of the cohesion establishment factor Eco after meiotic S phase, but before oocyte maturation, causes premature loss of meiotic cohesion, resulting in destabilization of chiasmata and subsequent missegregation of recombinant homologs. Reduction of individual cohesin subunits or the cohesin loader Nipped B during prophase I leads to similar defects. These data indicate that loading of newly synthesized replacement cohesin rings by Nipped B and establishment of new cohesive linkages by the acetyltransferase Eco must occur during prophase I to maintain cohesion in oocytes. Moreover, we show that rejuvenation of meiotic cohesion does not depend on the programmed induction of meiotic double strand breaks that occurs during early prophase I, and is therefore mechanistically distinct from the DNA damage cohesion re-establishment pathway identified in G2 vegetative yeast cells. Our work provides the first evidence that new cohesive linkages are established in Drosophila oocytes after meiotic S phase, and that these are required for accurate chromosome segregation. If such a pathway also operates in human oocytes, meiotic cohesion defects may become pronounced in a woman's thirties, not because the original cohesive linkages finally give out, but because the rejuvenation program can no longer supply new cohesive linkages at the same rate at which they are lost.

Revised (207 words, 31% reduction)

Chromosome segregation errors are the leading cause of birth defects, and as women age, gradual loss of cohesive linkages between sister chromatids dramatically increases risk of aneuploid pregnancy. Here we provide evidence from Drosophila oocytes that a rejuvenation program acts during prophase I to replace lost cohesive linkages. This rejuvenation appears to involve the acetyltransferase Eco and cohesin loader Nipped B. Gal4/UAS-induced Eco knockdown after meiotic S phase, but before oocyte maturation, caused premature loss of meiotic cohesion, resulting in destabilization of chiasmata and subsequent missegregation of recombinant homologs. Similar defects were observed when individual cohesin subunits or Nipped B were knocked-down during prophase I. We further show that rejuvenation of meiotic cohesion does not depend on programmed induction of double strand breaks during early prophase I, and is therefore distinct from the pathway in G2 phase that re-establishes cohesion following DNA damage. Our work provides the first evidence that new cohesive linkages are established in Drosophila oocytes after meiotic S phase, and that these are required for accurate chromosome segregation. If such a pathway also operates in human oocytes, our results suggest that meiotic cohesion defects may become pronounced as women age because the rejuvenation program fails to replace new cohesive linkages as they are lost.

EXAMPLE 4: An abstract in ecology (*Ecological Monographs* 71:401, 2001)

Original (377 words)

This paper reports on the response by amphibians, benthic macroinvertebrates, and zooplankton in naturally fishless alpine lakes to fish introductions and subsequent fish disappearance. We assessed resistance (the degree to which a system is altered when the environment changes) by comparing faunal distribution and abundance in lakes that have never been stocked with fish vs. the distribution and abundance in lakes that have been stocked and still contain fish. We assessed resilience (the degree and rate of a system's return to its previous configuration once the perturbation is removed) by comparing faunal distribution and abundance in lakes that were stocked at one time but have since reverted to a fishless condition (stocked-now-fishless lakes) vs. the distribution and abundance in lakes that have never been stocked. We quantified recovery rates and trajectories by comparing faunal assemblages of stocked-now-fishless lakes that had been fishless for 5-10, 11-20, and >20 yr.

Faunal assemblages in the study lakes had low resistance to fish introductions, but in general showed high resilience. The mountain yellow-legged frog (Rana muscosa), conspicuous benthic macroinvertebrates, and large crustacean zooplankton (>1 mm) were dramatically reduced in distribution and abundance by fish introductions but generally recovered to predisturbance levels after fish disappearance. Inconspicuous benthic invertebrate taxa, small crustacean zooplankton (<1 mm), and rotiferan zooplankton (<0.2 mm) were either unaffected by fish or increased in the presence of fish. For both the benthic macroinvertebrate.community and the zooplankton community as a whole, fish disappearance was followed by a steady change away from the configuration characteristic of fish containing lakes and toward that of lakes that had never been stocked. Both communities remained markedly different from those in never-stocked lakes 5-10 yr after fish disappearance and converged on the configuration of never-stocked lakes only 11-20 yr after fish disappearance.

Recovery was likely facilitated by the winged adult stages of many benthic macroinvertebrates, resting eggs of zooplankton, and nearby source populations of frogs. However, many frog populations have disappeared since the time that lakes in this study reverted to a fishless condition, and the viability of zooplankton egg banks should decline in fish containing lakes over time. As a result, faunal resilience may be lower in lakes that revert to a fishless condition today than is suggested by the results of our study.

Revised (246 words, 35% reduction)

This paper examines how the introduction of fish into alpine lakes alters distribution and abundance of amphibians, benthic macroinvertebrates, and zooplankton (resistance), as well as whether and how quickly those parameters return to pre-introduction levels after the fish disappear (resilience). We assessed resistance by comparing lakes never stocked with fish and stocked lakes still containing fish. We assessed resilience by comparing never-stocked lakes and stocked lakes that have lost the fish. We also compared stocked lakes that have been fishless for periods from 5 to more than 20 years. Fish introduction dramatically reduced the distribution and abundance of the mountain yellow-legged frog (Rana muscosa), conspicuous benthic macroinvertebrates, and large crustacean zooplankton (>1 mm), which generally returned to predisturbance levels after fish disappearance. Conversely, fish introduction either did not affect, or even increased, the distribution and abundance of inconspicuous benthic invertebrate taxa, small crustacean zooplankton (<1 mm), and rotiferan zooplankton (<0.2 mm). Benthic macroinvertebrate and zooplankton communities returned to their pre-introduction state only after at least 11 yr of fish absence. This recovery was likely facilitated by the winged adult stages of many benthic macroinvertebrates, resting eggs of zooplankton, and proximity of source populations of frogs. Many frog populations have disappeared since the time that the stocked lakes in this study lost their fish, and the viability of zooplankton egg banks are expected to decline in fish-containing lakes. As a result, faunal resilience may be even lower in stocked lakes that lose their fish in the future.