Pre-AP Biology Summer Assignment 2018-19

Paradise High School, Mrs. Wood, lwood@pisd.net

Welcome to Pre-AP Biology! I am excited to get a jump on the upcoming school year. These assignments will help us get a head start on the curriculum and lay the foundation before school starts. If you have any questions, please email me.

Supplies – bring first day of school
Composition notebook (no spirals) – left in class
Folder – kept by the student for graded papers
Pencils/Pens
Glue sticks
Scotch tape
Kleenex

1 - Create an account on EDPuzzle and watch 5 videos and complete Cornell notes. Guides for Cornell notes can be found on my webpage. Go to edpuzzle.com, sign up as a student and use code – edsobfo – to join the summer biology class. *Due the first day of school.*

2 - Read 3 selected articles and take notes on each one using Cornell note taking style. The student must handwrite the notes and turn them in the *first day of school.* You can find links on my webpage to help you with the method of Cornell note taking.

3 - Studying the language of science is like learning a new language. Biology is largely comprised of Latin, so you will need to learn the following prefixes, suffixes, and roots from the next two pages. Study the attached list. Pay particular attention to the words used in the videos. These are a part of our first unit. There will be a *Prefix, Suffix, and Vocab Test the first week of school.*

4. Using the list from the following two pages, construct 20 words by combining prefixes and suffixes. Each word must be followed by a definition of what the word means. Your words do not have to be real words. You can have as many prefixes/suffixes in the word as you like. Example: Chlorophobia- fear of the color green. *Due the first day of school.*

5. – Specimen Collection – Collect, preserve, display, and name 10 organisms from the same Phylum. For example, collect 10 wildflowers, native grasses, tree leaves, insects, etc. Using preservation techniques such as glycerin, rubbing alcohol, or hand sanitizer preserve and display organisms in a box or book type setting. Identify the organism using the common name and scientific name, and label each specimen. *Due the first day of school*

Name_____ Date _____Class_____

Language of Science

Example: biology – life, study or science (study of life)

1. phototropism—
2. hydrophobic—
3. heterotroph—
4. homeostasis—
5. multicellular—
6. hypodermic—
7. anthropology—
8. hypothermic—
9. gymnosperm—
10. pseudopod—
11. photograph—
12. autograph—
13. neuralgia—
14. decapod—
15. hepatitis—
16. cytology—
17. zoology—
18. microbiology—
19. geology—
20. cardiology—

Notice that several prefixes can mean the same thing:

21. What are two prefixes that mean ONE or SINGLE? _____ _____

22. What are two suffixes that mean CUT or CUT OUT? _____ _____

23. What are two prefixes that mean ABOVE or ON? _____ _____

24. What are two prefixes that mean TWO? _____ _____

Just knowing one part of a word gives you a clue to the whole word:

25. Would you want to be careful when touching an animal called an ECHINDNA? Yes No

26. What does a CARNIVORE eat? _____

27. Is a NEONATE a tiny baby or an old person? _____

28. Is a CRANIOTOMY a serious surgery? Yes No

29. An ALBINO rabbit is what color? _____

30. Does an AMPHIBIAN live on land or water? _____

31. If a medicine is CONTRAINDICATED for you, should you take it? Yes No

32. A DERMATOLOGIST works with what part of the body? _____

33. How does a tiny animal called a ROTIFER travel through the water? _____

(hint: look up rota)

34. If you visited the Elysian Park ARBORETUM, what would you expect to see? _____

35. In 1969, where did the LUNAR mission land? _____

36. What is another name for a CHRONOMETER? _____

37. Why do they call this symbol (*) an ASTERISK? _____

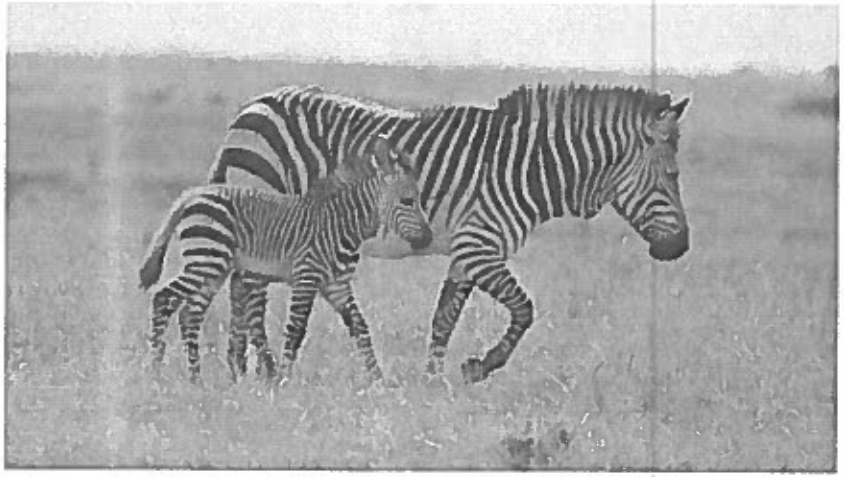
Scientific Root Words, Prefixes, And Suffixes

a-, an-	not, without, lacking, deficient
ab-	away from, out from
-able	capable of
ac-	to, toward
-aceous	of or pertaining to
acou-, acous-	hear
ad-	to, toward
aden-	gland
adip-	fat
aero-	air
agri-	field, soil
-al	having the character of
alb-	white
alg-, -algia	pain
alto-	high
ambi-	both
ameb-	change, alternation
amni-	fetal membrane
amphi-, ampho-	both
amyl-	starch
ana-	up, back, again
andro-	man, masculine
anemo-	wind
ang-	choke, feel pain
angi-	blood, vessel, duct
ante-	before, ahead of time
anter-	front
antho-	flower
anti-	against, opposite
anthropo-	man, human
-ap-, -aph-	touch
apo-, ap-	away from
aqu-	water
archaeo-	primitive, ancient
-ary, -arium	denotes a place for something
arteri-	artery
arthr-	joint, articulation
-ase	forms names of enzymes
aster-, astr-	star
-ate	verb form – the act of
anther-	fatty deposit
-ation	noun form – the act of
atmo-	vapor
audi-	hear
aur-	ear
auto-	self
bacter-, bactr-	bacterium, stick, club
barb-	beard
baro-	weight
bath-	depth, height
bene-	well, good
bi- (Latin)	two twice
bi-, bio- (Greek)	life, living
-blast-	sprout, germ, bud
brachi-	arm
brachy-	short
brady-	slow
branchi-	fin
brev-	short
bronch-	windpipe
cac-.	bad
calor-	heat
capill-	hair
capit-	head
carcin-	cancer
cardi-	heart
carn-	meat, flesh
carp-	fruit
carpal-	wrist
cata-	breakdown, downward
caud-	tail
-cell-	chamber, small room
cen-, cene-	now, recent
cente-	pierce
centi-	hudredth
centr-	center
cephal-	head
cerat-	horn
cerebr-	brain
cervic-	neck
chel-	claw
chem-	dealing with chemicals
chir-	hand
chlor-	green
chondr-	cartilage
chrom-, -chrome	color
chron-	time
-chym-	juice
-cid-, -cis-	cut, kill, fall
circa-, circum-	around, about
cirru-	hairlike curls
co-	with, together
cocc-	seed, berry
coel-	hollow
coll-	glue
coni-	cone
contra-	against
corp-	body
cort-, cortic-	outer layer
cosmo-	world, order, form
cotyl-	cup
counter-	against
crani-	skull
cresc-, cret-	begin to grow
crypt-	hidden, covered
-cul-, -cule	small, diminutive
cumul-	heaped
cuti-	skin
cyan-	blue
-cycle, cycl-	ring, circle
-cyst-	sac, pouch, bladder
cyt-, -cyte	cell, hollow container
dactyl-	finger
de-	away from, down
deca-	ten
deci-	tenth
deliquesc-	become fluid
demi-	half
dendr-	tree
dent-	tooth
derm-	skin
di-, dipl- (Latin)	two, double
di-, dia- (Greek)	through, across, apart
dia- (Latin)	day
digit-	finger, toe
din-	terrible
dis-	apart, out
dorm-	sleep
dors-	back
du-, duo-	two
-duct	lead
dynam-	power
dys-	bad, abnormal, difficult
ec-	out of, away from
echin-	spiny, prickly
eco-	house
ecto-	outside of
-elle	small
-emia	blood
en-, endo-, ent-	in, into, within
-en	made of
encephal-	brain
enter-	intestine, gut
entom-	insects
-eous	nature of, like
epi-	upon, above, over
-err-	wander, go astray
erythro-	red
-escent	becoming
eso-	inward, within, inner
eu-	well, good, true, normal
eury-	widen
ex-	out of, away from
extra-	beyond, outside
-fer-	bear, carry, produce
ferro-	iron
fibr-	fiber, thread
-fid, fiss-	split, divided into
-flect, -flex	bend
flor-	flower
flu-,fluct-,flux	flow
foli-	leaf
fract-	break
-gam-	marriage
gastr-	stomach
geo-	land, earth
-gen, -gine	producer, former
-gene-	origin, birth
-gest-	carry, produce, bear
-glen-	eyeball
-glob-	ball, round
gloss-	tongue
gluc-, glyc-	sweet, sugar
glut-	buttock
gnath-	jaw
-gon	angle, corner
-grad-	step
-gram, graph	record, writing
grav-	heavy
-gross-	thick
gymno-	naked, bare
gyn-	female
gyr-	ring, circle, spiral
-hal-, -hale	breathe, breath
halo-	salt
hapl-	simple
hector-	hundred
-helminth-	worm
hem-	blood
hemi-	half
hepar-, hepat-	liver
herb-	grass, plants
hetero-	different, other
hex-	six
hibern-	winter
hidr-	sweat
hipp-	horse
hist-	tissue
holo-	entire, whole
homo- (Latin)	man, human
homo- (Greek)	same, alike
hort-	garden
hydr-	water
hygr-	moist, wet
hyper-	above, beyond over
hyph-	weaving, web
hyphno-	sleep
hypo-	below, under, less
hyster-	womb, uterus
-iae	person afflicted with disease
-iasis	disease, abnormal condition
-ic	(adjective former)
-chthy-	fish
ign-	fire
in-, il-, im-, ir-	not
in-, il-, im-, ir-	to, toward, into
in-	very, thoroughly
-ine	of or pertaining to
infra-	below, beneath
inter-	within, inside
intra-	between
-ism	a state or condition

iso-	equal, same
-ist	person who deals with
-it is	inflammation, disease
-ium	refers to a part of the body
-kary-	cell nucleus
kel-	tumor, swelling
kerat-	horn
kilo-	thousand
kine-	move
lachry-	tear
lact-	milk
lat-	side
leio-	smooth
-less	without
leuc-, leuk-	white, bright, light
lign-	wood
lin-	line
lingu-	tongue
lip-	fat
lith-, -lite	stone, petrifying
loc-	place
-log-	word, speech
-logist	one who studies
-logy	study of
lumin-	light
-lys, -lyt, -lyst	decompose, split, dissolve
macr-	large
malac-	soft
malle-	hammer
mamm-	breast
marg-	border, edge
mast-	breast
med-	middle
meg-	million, great
mela-, melan-	black, dark
-mer	part
mes-	middle, half, intermediate
met-, meta-	between, along, after
-meter, -metry	measurement
micro-	small, millionth
milli-	thousandth
mis-	wrong, incorrect
mito-	thread
mole-	mass
mono-	one, single
mort-	death
mot-	move
morph-	shape, form
multi-	many
mut-	change
my-	muscle
myc-	fungus
mycel-	threadlike
myriad-	many
moll-	soft
nas-	nose
necr-	corpse, dead
nemat-	thread
neo-	new, recent
neprho-	kidney
-ner-	moist, liquid
neur-	nerve
noct-, nov-	night
-node	knot
-nom-, -nomy	ordered knowledge, law
non-	not
not-	back
nuc-	center
ob-	against
ocul-	eye
oct-	eight
odont-	tooth
-ond	form, appearance
olf-	smell
oligo-	few, little
-oma	abnormal condition, tumor
omni-	all
onc-	mass, tumor
oo-	egg
opthalm-	eye
opt-	eye
orb-	circle, round, ring
-orium, -ory	place for something
ornith-	bird
orth-	straight, correct, right
oscu-	mouth
-osis	abnormal condition
oste-	bone
oto-	ear
-ous	full of
ov-	egg
oxy-	sharp, acid, oxygen
pachy-	thick
paleo-	old, ancient
palm-	broad, flat
pan-	all
par-, para-	beside, near, equal
path-, -pathy	disease, suffering
-ped-	foot
-ped-	child
pent-	five
per-	through
peri-	around
permea-	pas, go
phag-	eat
pheno-	show
-phil-	loving, fond of
phon-, -phone	sound
-phore,, pher-	bear, carry
photo-	light
phren-	mind, diaphragm
phyc-	seaweed, algae
phyl-	related group
-phyll	leaf
physic-	nature, natural qualities
phyt-, phyte	platn
pino-	drink
pinni-	feather
plan-	roaming, wandering
plasm-, -plast-	form, formed into
platy-	flat
pleur-	lung, rib, side
pneumo-	lungs, air
-pod	foot
ply-	many, several
por-	opening
port-	carry
post-	after, behind
pom	fruit
pre-	before, ahead of time
prim-	first
pro-	forward, favoring, before
p[roto-	first, primary
pseudo-	false, deceptive
psych	mind
pter-	having wings or fins
pulmo-	lung
puls-	drive, push
pyr-	heat, fire
quadr-	four
quin-	five
radi-	ray
re-	again, back
rect-	right, correct
ren-	kidney
ret-	net, made like a net
rhag-, -rrhage	burst forth
rhe-, rrhea	flow
rhin-	nose
rhiz-	root
rhodo-	rose
roto-	wheel
rubr-	red
sacchar-	sugar
sapr-	rotten
sarc-	flesh
saur-	lizard
schis-, schiz-	split, divide
sci-	know
scler-	hard
-scop-	look, device for seeing
-scribe, -script	write
semi-	half, partly
sept-	partition, seven
-septic	infection, putrefaction
sess-	sit
sex-	six
-sis	condition, state
sol-	sun
solv-	loosen, free
som-, somat-, -some	body
somn-	sleep
son-	sound
spec-, spic-	look at
-sperm-	seed
-spher-	ball, round
spir-, -spire	breathe
-spor-	seed
stat-, -stasis	standing, placed, staying
stell-	stars
sten-	narrow
stern-	chest, breast
stom-, -stome	mouth
strat-	strat
stereo-	solid, 3-dimensional
strict-	drawn tight
styl-	pillar
sub-	under, below
super-, sur-	over, above, on top
sym-, syn-	together
tachy-	quick, swift
tarso-	ankle
tax-	arrange, put in order
tele-	far off, distant
telo-	end
terr-	earth, land
tetr-	four
thall-	young shoot
-the-, -thes-	put
-thel-	cover a surface
therm-	heat
-tom-	cut, slice
toxico-	poison
top-	place
trache-	windpipe
trans-	across
tri-	three
trich-	hair
-trop-	turn, change
-troph-	nourishment, one who feels
turb-	whirl
-ul-, -ule	diminutive, small
ultra-	beyond
uni-	one
ur-	urine
-ura	tail
vas-	vessel
vect-	carry
ven-, vent-	come
ventr-	belly, underside
-verge	turn, slant
vig-	strong
vit-, viv-	life
volv-	roll, wander
-vor-	devour, eat
xanth-	yellow
xero-	dry
xyl-	wood
zo-, -zoa	animal
zyg-	joined together
zym-	yeast

Zebra poop shows that life without enough resources can cause stress

By Smithsonian.com, adapted by Newsela staff on 12.06.17
Word Count 943
Level 1200L



Compared to their cousins, the more populous plains zebra, the cape zebras are thinner, have narrower hooves and sport a distinctive barcode-like stripe pattern on their backs. Photo by: Brian Snelson/Wikimedia

For conservation scientists, the proof isn't in the pudding — it's in the poop. It turns out that wild zebras have been dropping vital clues about their stress levels in the form of feces. Researchers are now beginning to unravel these smelly piles of data to learn important clues about the animals' well-being.

"Poop allows us to get into the inside of the animal," says Rachel Santymire, director of the Davee center for Epidemiology and Endocrinology at the Lincoln Park Zoo in Chicago. "I always say they can't lie to me."

Poop-scooping has proved especially useful for cape zebras. A once-precariously endangered species, today it inhabits the eastern and western capes in the southern end of Africa. Compared to their cousins, the more numerous plains zebra, they are thinner, have narrower hooves and sport a distinctive barcode-like stripe pattern on their backs.

Their unusual looks, however, have gotten them into some trouble.

Between 1960 and 1980, populations declined due to habitat destruction, fencing and unregulated hunting for their distinctive striped pelts. At its lowest point, the population dwindled to just 80 animals stranded on three separate mountaintops. Despite the recovery in recent years, scientists remain uncertain whether current numbers can survive new pressures. They face habitat destruction due to human development and a changing climate that may turn their last hold-outs into unsuitable habitat.

Hormones Are Indicators Of High Stress

To track the success of past conservation efforts, biologists are now analyzing zebra poop for hormones that indicate high levels of stress. Glucocorticoid hormones, in particular, can help regulate stress responses in animals that influence whether they will fight or flee. Traces of these biochemicals can be found in droppings, skin, nails and hair. And it is not just in zebras, but in humans and most other mammals.

Susanne Shultz studies evolutionary biology at the University of Manchester and is one of the coauthors of a study recently published in Functional Ecology. Researchers have used poop to determine animal stress before, she says. But until now, nobody has used poop-embedded stress hormones to compare animals across a population, or to compare the relative stress between populations living in different habitats.

Given how much long-term population data researchers have on them and their remarkable comeback, cape zebras might make the perfect subject.

Today there are between 4,000 and 5,000 zebras in the wild, spread across 75 different populations. The Mountain Zebra National Park, founded in 1937, is meant to protect some of the last remaining savannas in the southern part of the country. This has helped sustain the zebra population. But some 95 percent of the cape zebras come from one of three populations that survived the tough times in the 20th century, meaning they all have very similar genetics and could more easily be wiped out by disease.

Moreover, Shultz says that some aren't doing well possibly due to the fact they've been forced into a less desirable habitat. The area where they live is too dry for them. Climate change may be further complicating the issue, Shultz says, as it is causing rainfall to become less predictable in the area, which can affect suitable habitat for zebras.

Struggling Animals Are Constantly Stressed

"It's perceived that that's where the mountain zebra want to be rather than that's where the mountain zebra were left," she says. "What seems like a good outcome might not be as good as we think it is."

Shultz and her coworkers used poop samples to track the success of management efforts in real time. Starting in 2011, they took six sampling trips to six different zebra populations over the span of two years. They examined the poop for glucocorticoid hormones and checked on the health of the males by testing their testosterone hormone levels. The findings were compared with general species information.

In the populations that did well, they found high levels of testosterone only in mating seasons and high stress only during the cold season. But in the struggling populations, the animals had more constant testosterone and stress levels. "They never had a break, essentially," Shultz says. Over the whole two-year period they were constantly stressed out.

This might be because their environment does not meet their needs. But it might also have to do with an imbalance of males and females in the population. If there are too many males, it raises their stress and testosterone levels as they compete for females, according to Shultz.

Poop Is Readily Available For Studies

Tracking stress responses by using poop is a game-changer because it's noninvasive and the raw materials aren't exactly hard to come by, says Santymire, who wasn't involved in the recent study. Shultz and her coauthors did a good job of tracking individuals through poop samples, she adds. They paid attention to the animals' diets and controlled for seasonal changes.

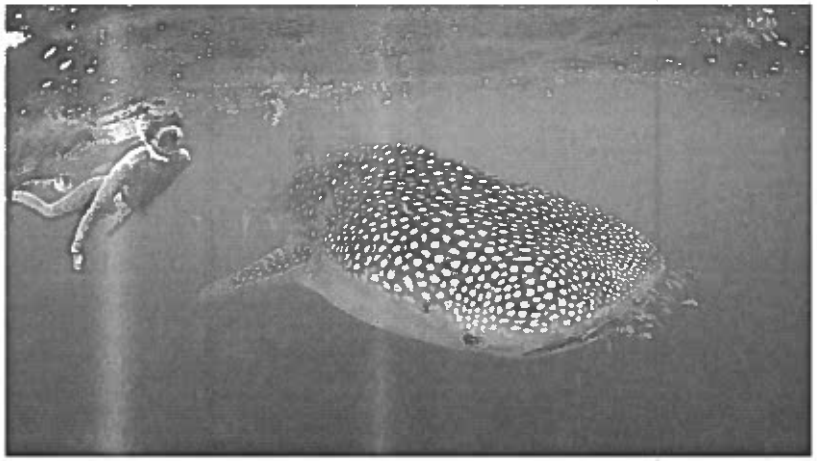
A few years ago, Santymire — whose coworkers know her as "Dr. Poop" — also published a poop study. It examined how increased predators and competition impacted the health and reproductive rates of black rhinos in South Africa. However, she and her coworkers are now starting to move away from using feces. The biochemical keratin found in claws and nails and even snake skins are better at determining high-stress levels, she says.

Keratin doesn't change as much day by day, so these samples can provide more accurate readings, she says. Yet as far as Shultz is concerned, there is a bright future in scooping up poop from all kinds of animals — not just zebras.

"The zebra are a really good test case because we have long-term data," she says. But "the idea is to prove this concept with this species."

Researchers use environmental DNA in ocean water to study whale sharks

By Los Angeles Times, adapted by Newsela staff on 11.30.16
Word Count **633**



A female snorkeler swims with a whale shark, Rhincodon typus, off the coast of Africa. **Ullstein Bild/Getty Images**

Whale sharks are the largest fish in the ocean, but their size doesn't make them any easier to study. Scientists hoping to learn about them must spy on them from the air, tag them with devices so they can be tracked via satellite or sneak up on them to collect tissue samples for analysis. But there may be an easier way.

Researchers from Denmark and Qatar were able to learn about a group of whale sharks in the Persian Gulf without using any of those methods. Instead, the researchers gathered the seawater around them and analyzed the "environmental DNA" it contained.

Samples Of Seawater

A report published Monday in Nature Ecology & Evolution describes the researchers' findings. The research team used 20 samples of seawater to study the recently discovered group of about 200 whale sharks. They were able to show that the group was more closely related to whale sharks from the tropical portions of the Indian and Pacific oceans than to the colonies in the Atlantic. They were also able to estimate the number of breeding females in the population.

The surface seawater samples were collected from 15 spots around the Al Shaheen oil field, where the whale sharks had been observed. Most of the samples contained just 1.5 liters of water, which is just over 6 cups.

The researchers used DNA sequencing machines to decode the mitochondrial DNA extracted from the water. DNA sequencing gives information about the exact genetic structure of a creature. Mitochondrial DNA, which is passed down from mother to child virtually unchanged, is often used in evolutionary biology to determine whether two populations of animals are related.

Mitochondrial Genome

The researchers zeroed in on just a few sections of the mitochondrial genome, which is a complete set of genetic instructions. This allowed them to gauge the genetic diversity, the total number of genetic characteristics, of the Persian Gulf whale sharks. They then compared the sharks to their cousins in the Atlantic, Indian and Pacific oceans.

The team also had access to mitochondrial DNA from tissue samples collected from 61 whale sharks who swam in the same waters. They used the DNA from the other sharks to check their work. The researchers found genetic fingerprints — collections of mutations known as haplotypes — in similar frequencies in both the seawater and the whale shark tissue. What's more, the catalog of haplotypes gathered from the seawater was more complete than the ones contained in the tissue samples alone.

By counting up the accumulated mutations in certain parts of the genome, the researchers calculated that the whale sharks had an "effective female population size" of between 43,618 and 183,526. This is the population of mothers that give birth to the next generation. Doing the same analysis with the tissue samples instead of the DNA from seawater yielded a range of 85,087 to 351,654 females.

The average of the two ranges was off by nearly a factor of two (71,600 versus 138,400). However, the fact that they overlapped at all shows that environmental DNA offers a promising way to estimate effective population size, the researchers wrote.

Spawning Tuna

The seawater samples also contained DNA fragments from mackerel tuna, which spawn near Al Shaheen. In fact, the greater the concentration of whale shark DNA, the greater the concentration of tuna DNA. The reverse was also true. When whale shark DNA was relatively scarce, tuna DNA was scarce as well. This is most probably a sign that the whale sharks had come to the area to hunt the tuna, the researchers wrote.

Other groups have already used environmental DNA to identify the inhabitants of certain waters. However, this is the first study to show that environmental DNA can provide meaningful information about a population of animals and the biodiversity of their habitat, the authors wrote.

What does a bear do in the Alaska woods? Disperse seeds

By Dan Joling, Associated Press, adapted by Newsela staff on 02.26.18
Word Count 544
Level MAX

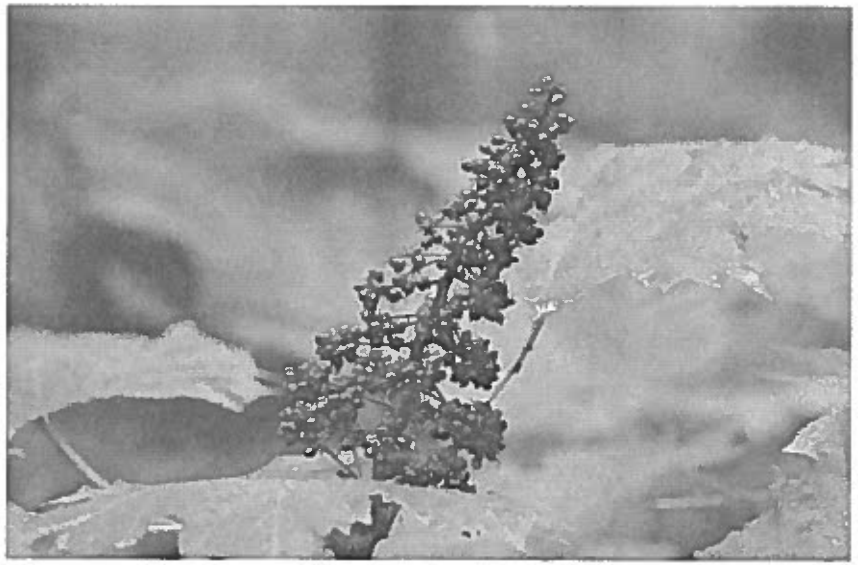
A black bear walks through dense bushes of blueberries in Juneau, Alaska. A study of bears and berries has determined that the big animals are the main dispersers of fruit seeds in southeast Alaska. Photo from: Taal Levi and Laurie Harrer via AP

Does a bear leave scat in the woods? The answer is obvious but the effects on an ecosystem may not be.

Researchers from Oregon State University did a study. It concludes that brown and black bears -- and not birds, as commonly thought -- are primary distributors of small fruit seeds in southeast Alaska. The bears spread the seeds through their excrement.

"Bears are essentially like farmers," said Taal Levi, an Oregon State assistant professor. "By planting seeds everywhere, they promote a vegetation community that feeds them."

Seed dispersal is a key component in the understanding of any ecosystem, Levi said. The study is the first instance of a temperate plant being primarily dispersed by mammals through their gut. The finding suggests repercussions for plant life when bears are removed.



Brown bears, or grizzlies, flourish in size and numbers in the Tongass National Forest, America's largest. They gorge on spawning salmon in the forest's rivers, lakes and streams. As they wait for fish to enter streams, the bears eat berries.

Levi and graduate student Laurie Harrer, the study's primary author, set up motion-triggered video cameras. The cameras allowed them to detect which animals were eating berries. The researchers collected bear DNA from saliva left on plants after berries disappeared. They recorded birds picking off a few berries at a time. Bears were recorded gulping berries by the hundreds.

When brown bears shift to eating fish, black bears move into berry patches.

Both bears, through their scat, disperse fruit seeds by the thousands. This profoundly affects what grows in the forest, according to the researchers.

Rodents that find bear scat further disperse seeds. They bury the seeds in caches a few millimeters deep, Levi said. If rodents lose track of caches, there's a chance for new plant growth.

It's an intricate system starting with salmon attracting bears, Levi said.

Laura Gough is an ecologist at Towson University. She has conducted research for more than 20 years on how plants interact with other organisms in Alaska's tundra. Gough said a lot of ecology research focuses on uncovering those relationships and how whole systems change if they're disrupted.

"When you think about that, if the species is an important food source, then if that plant should diminish in abundance, there could be a whole suite of changes to that ecosystem," she said.

When she read the study, she said, she thought of the dodo bird stories she tells to students in biology classes. The extinct birds spread seeds of certain plants.

"When dodos went extinct, those plants basically went extinct as well," she said. "So, this link between animals that eat plant seeds and disperse them — that can maintain both populations."

The Oregon State study concludes that if bears are removed, the seeds they move would simply fall to the ground. A decline in bear density, even if only brown bears, likely leads to a reduction in seed dispersal. And that would have consequences for plants.