Sexual reproduction in species of *Phytophthora* is controlled by hormones. W. H. Ko of the University of Hawaii, Hilo, used polycarbonate membranes to prevent intimate contact between hyphae of different mating types while still allowing for interchange of hormones; A^2 isolates of so-called heterothallic species formed oospores when exposed to hormone α^1 secreted by A^1 isolates, and A^1 isolates did likewise when exposed to hormone α^2 secreted by A^2 isolates. Ko, with J. Y. Yu and H. S. Chang of Taiwan, studied the influence of timing, temperature, and light on hormone production and oospore formation using *P. colocasiae* (A^2) as a hormone producer and *P. parasitica* (A^1) as a hormone receptor (to form oospores). Again, the isolates were separated by polycarbonate membranes. When A^1 was exposed to A^2 hormone for only 5–7 hr, then moved apart, oospores formed in the A^2 isolate 6 days later; exposure for 48 hr or longer resulted in maximum oospore formation. Exposure to fluorescent light inhibited hormone production more than oospore formation. *P. colocasiae* grew well but produced little hormone at 30 C, whereas oospore formation was favored in *P. parasitica* at 30 C. (J. Gen. Microbiol. 123:249-252)

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The rate at which fresh plant material decomposes when added to soil has been a subject of both practical and scientific interest for many years, mainly because of implications for nutrient cycling and for eliminating pathogens in crop residue. Most studies with isotope-labeled plant materials have centered on cereal straws and grasses. J. N. Ladd, J. M. Oades, and M. Amato, CSIRO, Adelaide, Australia, incorporated ^{14}C,^{15}N-labeled medic (*Medicago littoralis*) into soils at four different field sites in the semiarid wheat belt of South Australia and monitored loss of organic material as well as net formation and decay of isotope-labeled soil biomass over 4 yr. Within 4 wk of incorporation, more than 50% of the medic ^{14}C was lost from all soils as $^{14}CO_2$. Thereafter, decomposition slowed significantly, with about 30% of the ^{14}C remaining after 8 wk and 15–20% after 4 yr. With the medic ^{15}N, 60–65% remained after 32 wk and 45–50% after 4 yr. The amounts of ^{14}C and ^{15}N as biomass were maximal 4–8 wk after incorporation of the labeled plant material and after 8 wk accounted for 14 % of the residual organic ^{14}C and 22% of the residual organic ^{15}N in the soil. Thereafter, biomass ^{14}C and ^{15}N accounted for progressively less of the total residual organic ^{14}C and ^{15}N, being 6 and 9%, respectively, after 4 yr. The balance remained in the soil as exocellular microbial products and debris. Rates of decomposition did not differ among the soils, but those with higher clay content generally retained larger portions of organic ^{14}C and ^{15}N in the biomass. (Soil Biol. Biochem. 13:119-126)

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Prolonged flooding of soil and associated anaerobic conditions is a well-known method of eradicating soilborne plant pathogens. Whether the lethal effect on propagules results directly from anaerobiosis or indirectly from biological destruction by anaerobic soil microorganisms has not been clear. J. B. Taylor and E. M. Guy of Auckland, New Zealand, using root-infecting basidiomycetes in buried wood, produced evidence that anaerobic soil microorganisms, probably species of *Bacillus* and *Clostridium*, are responsible for the destructive effects of flooding. Fungal isolates identified as *Hypholoma acutum* and *Collybia drucei*, partially to blame for decline and replant diseases of fruit and forest trees in New Zealand, survived 5 wk in wood buried in sterile flooded soil but not in wood buried in nonsterile flooded soil. The lethal property was restored to sterile soil with addition of only 0.5% (w/w) of nonsterile soil. None of several single isolates of *Bacillus* or *Clostridium* spp. were effective when added to sterile soil, but a mixture of four *Bacillus* and three *Clostridium* spp. gave biological control under flooded conditions nearly as effective as that of nonsterile flooded soil. (New Phytol. 87:729-732)

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Wild oat is among the most difficult weeds to control throughout the world because of the long-term persistence of the seeds in soil. Previous work has indicated a possible effect of ethylene in the complex control of dormancy by plant hormones, but attempts to use ethylene to break dormancy and promote germination have met with mixed and generally inconclusive results. If dormancy could be broken, the seedlings could then be killed by tillage or with an herbicide. S. W. Adkins and J. D. Ross of the University of Reading, England, have shown that ethylene strongly promotes germination of partly dormant, but not of fully dormant, wild oat seeds. The stimulatory effect was greater at 10–15 C than at 25 C; previous work showing no effect generally had been done at temperatures above 20 C. Either nondormant seeds do not respond to ethylene or the gas may have an inhibitory effect on them. The authors suggest that natural ethylene in the soil atmosphere may play a role in wild oat seed germination when the seeds are breaking dormancy but are not fully nondormant, and they propose applying ethylene-producing compounds to soil as a measure to control wild oat. (Plant Physiol. 67:358-362)

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The physiological mechanisms by which a plant adjusts to dry soil and produces more roots than a plant not under water stress have been investigated by R. F. Meyer and J. S. Boyer of the University of Illinois, Urbana. Soybean seedlings grown in the dark were transplanted to vermiculite containing only one-eighth the amount of water available to control seedlings. Within 12–15 hr, osmotic potential of the elongating hypocotyl had decreased to −12 bar compared with −7 bar in nonstressed controls. The lower osmotic potential involved osmoregulation by solute accumulation without a change in cell volume or turgor pressure in the hypocotyl. Solutes included amino acids, glucose, fructose, and sucrose transported to the elongating hypocotyl from the cotyledons; when the cotyledons were removed, the hypocotyl did not elongate or accumulate solutes. Water-stressed hypocotyls elongated slower than those in controls, despite the same turgor pressure; the slower growth is believed to represent some optimum between growth inhibition in favor of solute accumulation and growth maintenance for seedling establishment. When osmotic adjustment in the hypocotyl was complete, the solutes bypassed the hypocotyl to accumulate in the roots, which then grew faster than control roots and increased the root:shoot ratio. (Planta 151:482-489)

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