.LEXANDER, and **DIANE R. CAMP-**
, insect species visiting the spring

ca (spring beauty) is visited most exten-
.n distinctly different foraging behaviors.
nia virginica and gathers both pollen and
bee fly, is a generalist flower visitor and
each species was determined by measuring
sects are effective *Claytonia* pollinators and
ed in natural populations. The significance
in the reproductive ecology of forest spring

or reliability, fruit size, and andromonoecy

g systems has received little attention. An-
same plant) has generally been dismissed as
ilus pavia L.) I interpret andromonoecy as a
act scarce pollinators, and limited resources
cardium occidentale and some other andro-
l constraints. Abundance of bisexual flowers
distribution of bisexual flowers within inflo-
d/or mechanical requirements for fruit sup-

tribution of plants with extrafloral nectaries
l abundance.
undance of plants with extrafloral nectaries.
.013, in virgin deciduous forest understory,
11. Sandhills prairie was composed of three
al nectaries which changed seasonally. Fre-
ant abundance as indicated by response to
response was statistically significant at the

thwestern University. **Ant dispersal of seeds**
spected seed carriers.
ocephala and *Calathea ovandensis*, exhibit
field, 21 ant species are attracted to the arils
e ants *Odontomachus laticeps, O. minutus,*
ard their nests, as they do prey. At least *P.*
ninate more readily than seeds with arils. Ant
Myrmecochory, seed disperal by ants, may be
y thought.

ence of host plant population structure and
ct.
ogy of five populations of the biennial herb,
unties were analyzed during two consecutive
r-feeding herbivore, *Depressaria pastinacella*
s may vary greatly between populations and
h govern insect population size set potential
utilization. When insect populations are rel-
nd within-population plant density set actual
large, flowering phenology is the major de-
bivore on the populations studied is discussed
f this interaction.

d **ORLEY R. TAYLOR**, University of Kansas.
ation on *Helianthella quinquenervis*, a tem-

vis is usually collected by ants, which in turn
e number of flowers available for ant and fly
ude. A late frost in 1976 killed up to 99.7% of
imilar to those prior to 1976, but the tephritid
crease in predation by tephritid larvae on de-
ase in seedling recruitment into *Helianthella*

quinquenervis populations. Detailed censusing of ants and flies indicates that both are attracted to larger flower heads, but that ant densities and damage to flower heads are usually negatively correlated. Fly densities appear to be increasing since 1977, while flower densities have been relatively constant.

3:55 **LAMP, W. O.**, University of Nebraska, and **M. K. MCCARTY**, Science and Education Administration, USDA, Lincoln, NB. **Infestation patterns of three seed predators and their effect on *Cirsium canescens* seed production.**

Infestation patterns of three predispersal seed predators, *Paracantha culta* (Wiedemann), *Orellia occidentalis* (Snow) (both Diptera: Tephritidae), and *Homoeosoma stypticellum* Grote (Lepidoptera: Pyralidae), were related to seed production of their host, *Cirsium canescens* Nutt. The larvae of these insects feed on developing seeds within flower heads of successive stages of development. Ten plots of various plant densities, located at Arapaho Prairie, Nebraska, were monitored for insect density and seed production data during 1978. Insect and seed counts were analyzed for the effect of the location of the head on a plant, the aboveground biomass, and distance to nearest neighbor. Distribution of insects and seed production were compared among plants within and between plots. Those heads escaping seed predation by insects through time and space produce the majority of seeds from the thistle population.

Session 24. Contributed Papers: Ecosystem Interactions; Physical Sciences 141.

JOHN E. PINDER, Savannah River Ecology Laboratory, Aiken, SC 29801 (Tel. 803/824-6331), presiding.

1:00 **BIRK, ELAINE M.** Indiana University. **Litter disappearance in a dry eucalypt forest on the Australian east coast.**

Overstory leaves and twigs comprise 85% of the 7.5 tonne/ha litter layer measured in a dry eucalypt forest. Rates of overstory litter disappearance ranged between .5 and .61/yr using litter bags and tethered leaves. Litter fragmentation appears to be important in beginning eucalypt leaf breakdown, while leaves of the N-fixing understory plants appear to be more readily attacked by fungi. Since this type of eucalypt forest burns at about 10 year intervals, assuming a steady state litter mass can result in a systematic overestimate of decomposition rates. This error becomes relatively insignificant 5–10 years after fire.

1:20 **SANTOS, PERSEU F.** New Mexico State University. **The effect of bacteria-nematode-microarthropod interaction on the decomposition of creosotebush litter in a Chihuahuan desert ecosystem.**

A total of 200 mesh bags containing creosotebush litter were used to estimate bacterial, nematode and microarthropod numbers, length of fungal hyphae and percent of weight loss. Bags were buried at 20 cm in July 1978 and a set of 40 bags was collected each 5, 10, 20, 25 and 30 days. Each set was composed of: 10 Control, 10 Insecticide treated, 10 Insecticide + fungicide treated, and 10 Insecticide + fungicide + nematicide treated bags. Cephalobid nematodes were the first group of invertebrates to colonize the bags. Tydeid mites came next, followed by Pyemotid mites. The data suggest that when Tydeid mites are excluded from the bags, a high population of nematodes builds up which in turn graze heavily on bacterial cells decreasing their numbers drastically. This low number of bacterial cells slows down the rate of plant decomposition. Bacterial numbers increased constantly throughout the 30 days experiment when nematodes were excluded. The data suggest a unique indirect effect of mites and nematodes on litter decomposition.

1:40 **THOMAS, TED B., JERRY F. FRANKLIN,** and **JOSEPH MEANS.** U.S. Forest Service, Corvallis, OR. **Coarse woody debris in a chronosequence of northwestern coniferous forest stands.**

Snags and down logs are significant structural features of temperate forests and play important roles in energy and nutrient cycling, forest regeneration, and wildlife habitat. Large accumulations exist in virgin forests in the Pacific Northwest with their large dominant tree sizes. Eleven stands, from 100 to 1000+ years old were sampled to relate stand age to weight and volume of coarse woody debris (CWD). Stands were at midelevations in the Cascade Range, Washington and northern Oregon. *Pseudotsuga menziesii, Tsuga heterophylla, Abies amabilis,* and *Thuja plicata* dominated. Biomass of CWD ranged from 127 to 286 t/ha with 34 percent as snags and the remainder as logs. CWD biomass is correlated with stand age. Live/dead biomass ratio declines sharply in stands over 750 years. Amounts of CWD in younger stands are surprisingly high, much of it carried over from the previous forest.

2:00 **SHURE, DONALD J.,** and **EDWARD J. HUNT.** Emory University, Atlanta, GA. **Ecological responses to long-term perturbations in the Copper Basin of Tennessee.**

Broomsedge (*Andropogon*) grasslands have persisted within the SO_2-damaged landscape at Copper Basin, Tennessee since the turn of the century. The present study was undertaken to examine the changes in ecosystem properties along a perturbation gradient across Copper Basin and to compare broomsedge communities inside and outside of the basin. Herbaceous plant production decreased approximately 50 percent as woody vegetation gradually increased along the gradient. Broomsedge communities outside the basin had greater plant species diversity, more total production and less litter accumulation than