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**Title**

Biodiversity Conservation and Ecosystem Service Provision through Urban Food Cultivation

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# Biodiversity Conservation and Ecosystem Service Provision through Urban Food Cultivation

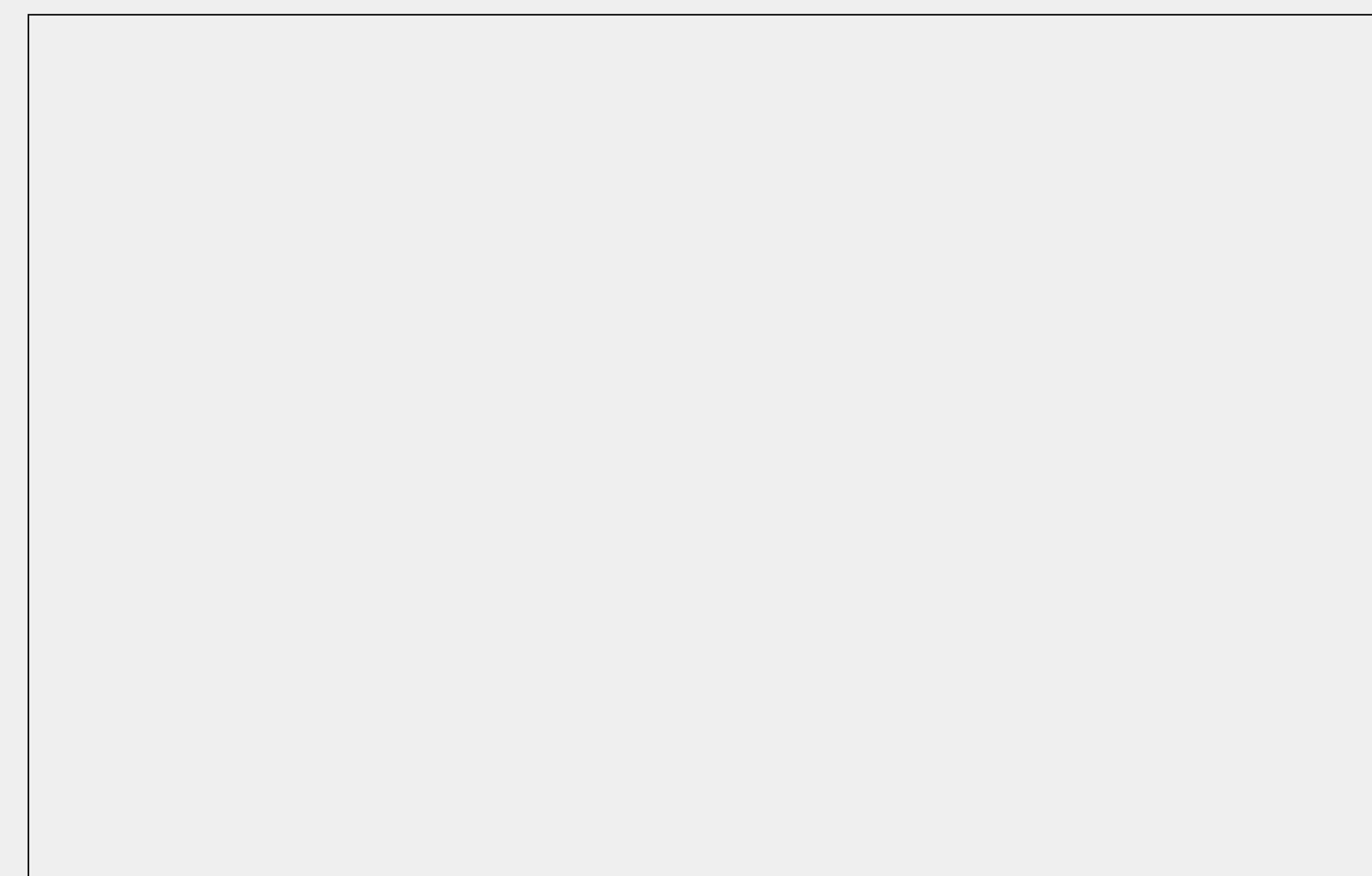
## The Philpott Lab

Dept. of Environmental Studies, University of California, Santa Cruz

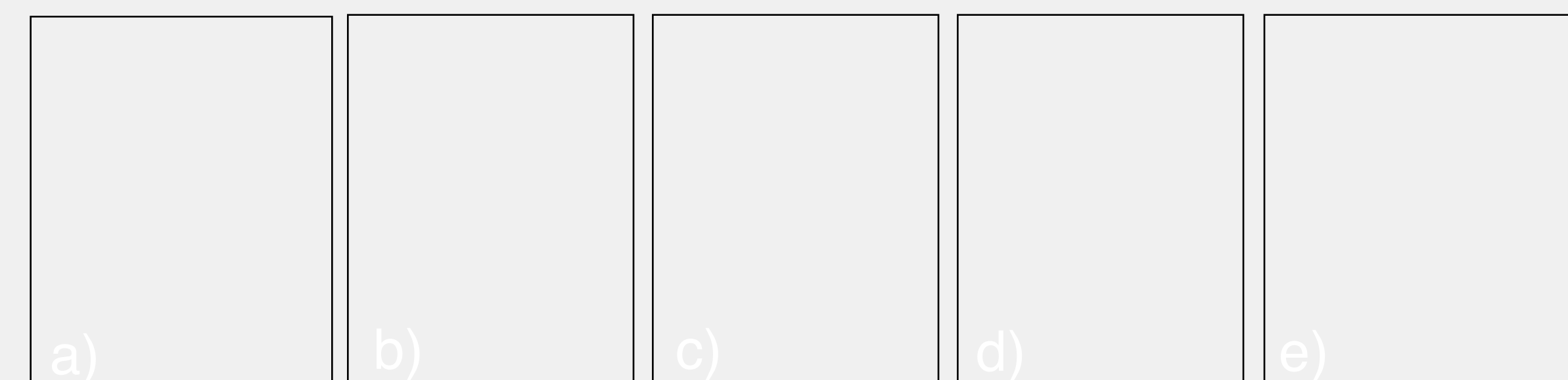
### Introduction

- Urbanization is associated with local and regional biodiversity loss
- Urban community gardens are important reservoirs of biodiversity conservation in urban landscapes, and garden food production relies on pollination and pest control services provided by biodiversity
- Landscape features, local habitat management, and facets of ecological communities provide these crucial services in gardens, but their relationships are complex
- Our research in the California Central Coast asks: **how do local management and landscape context drive biodiversity and the provisioning of ecosystem services in urban gardens?**

### Study System & Methodology

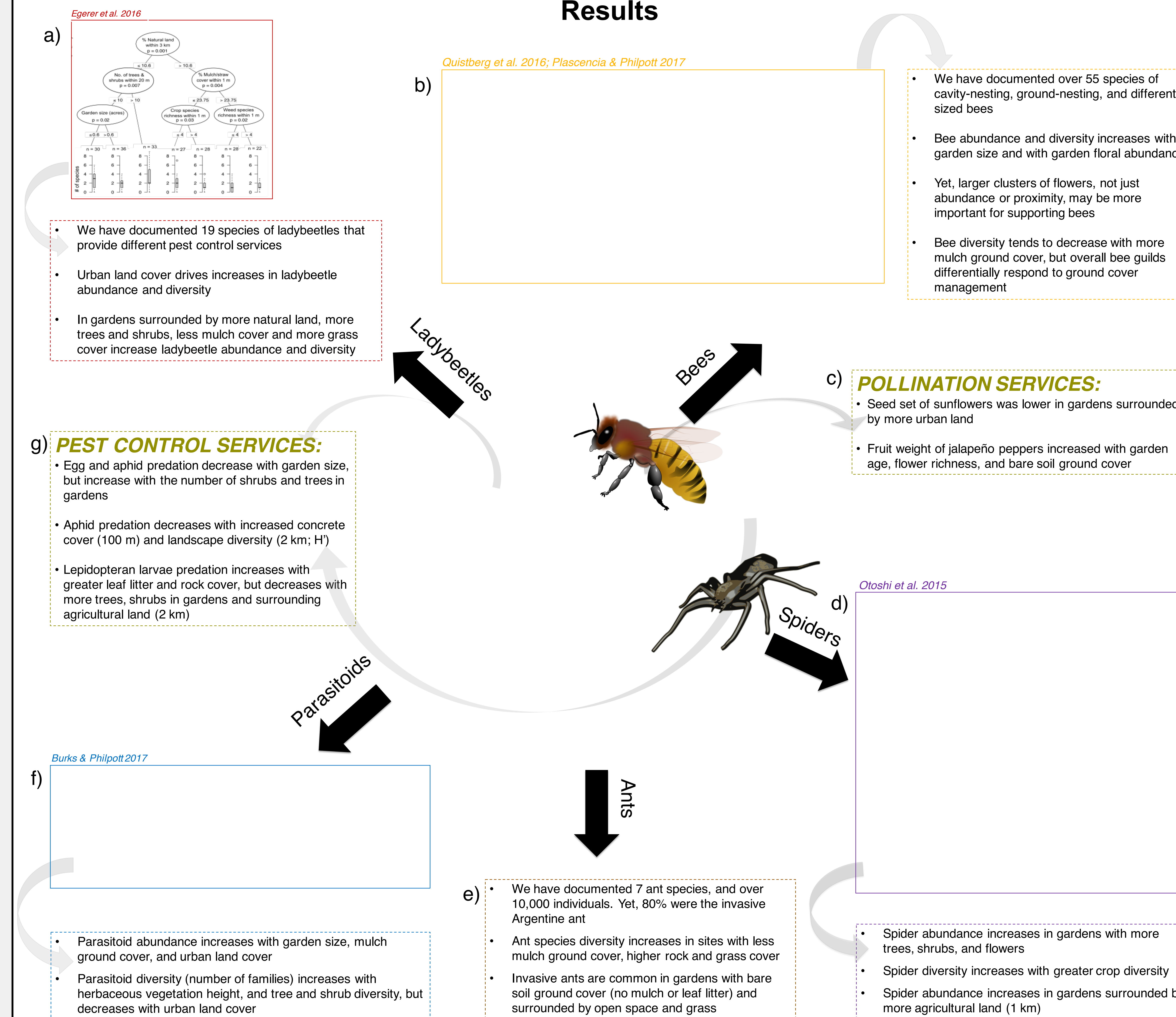


**Figure 1.** Garden study sites with 200 m buffers vary in surrounding landscape composition and degree of landscape intensification. Dominant land-use classes consist of urban, natural, agricultural, and open space land-uses. Here, gardens are placed in a landscape diversity and intensity matrix (1 km spatial extent).

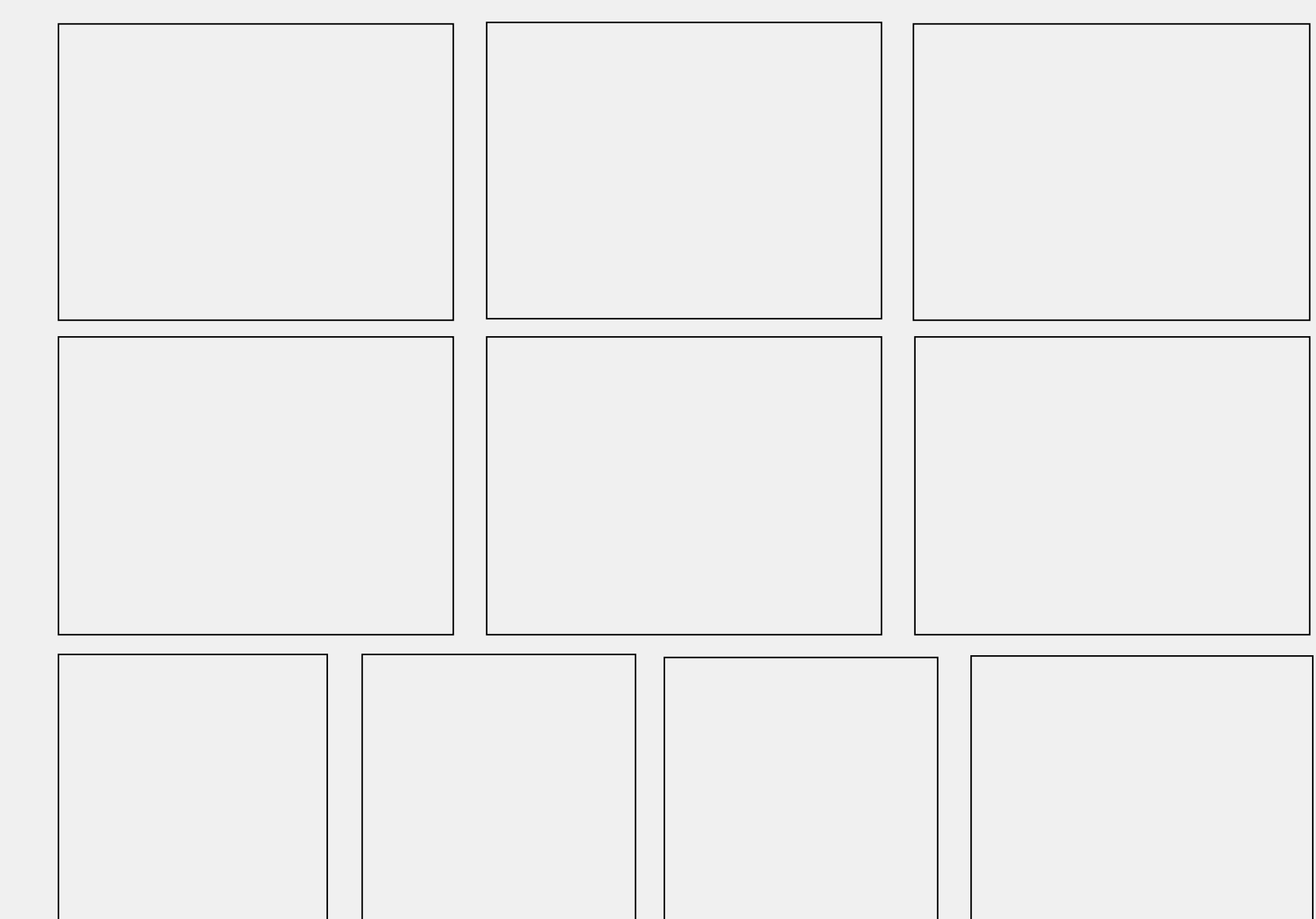


**Figure 2.** Our research uses different methods to examine garden biodiversity and ecology. We measure vegetation complexity and ground cover composition (a); we use sentinel pests to measure pest control (b); we identify pests (c), natural enemies (d), and pollinators (e). We visit the gardens monthly from May to September.

### Results



**Figure 3.** Local and landscape factors that influence ladybeetle species diversity (a), bee diversity (b), pollination services (c), spider diversity (d), ant diversity (e), parasitoid wasp diversity (f), and natural pest control services (g) in urban gardens.



**Figure 4.** Gardens vary in their local vegetation and ground cover management and their landscape surroundings, which influences pollinators, natural enemies, and pest populations.

### Conclusions

- In urban gardens, arthropod groups vary in how they respond to changes in local garden management and in the surrounding urban landscape
  - Ground cover has different effects across and within arthropod groups due to different life history strategies
  - Arthropod groups do not respond uniformly to increasing urbanization, agricultural intensification, or garden size
- Biodiversity and ecological interactions respond differently to changes in local and landscape factors in urban agricultural contexts than in rural agriculture
- Varying responses across groups associate ecosystem services with ecological trade-offs
- Urban conservation strategies and land planning must incorporate diverse strategies to support biodiversity and ecosystem services
- Our future work will explore:
  - Local, landscape, and social characteristics of gardens that influence plant and arthropod functional diversity
  - Gardener motivations and benefits from community garden participation, and how these social dimensions affect garden biodiversity and ecosystem service provision

### Acknowledgments

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