

# **Investigation and analysis of microbial information in tobacco-planted soil from different ecological regions in Guizhou province**

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# Outline



## Background and Objective



## Main Results



## Basic Physicochemical Characteristics of Soils



## Operational Taxonomic Unit Differences



## Soil Microbial Flora Analysis



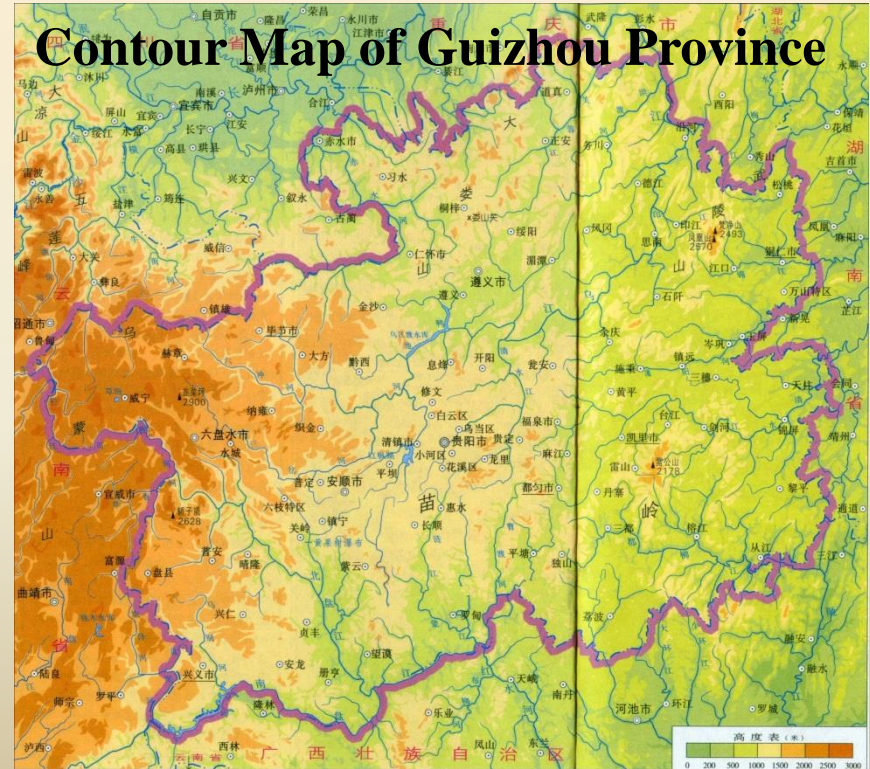
## Summary and Conclusion

# Background and Objective





Guizhou Province located in Southwest China and is a mountainous area. The average altitude is about 1100 m.



# Rhizosphere is a very unique environmental niche

## Effects of mycorrhizosphere bacteria on AM fungi

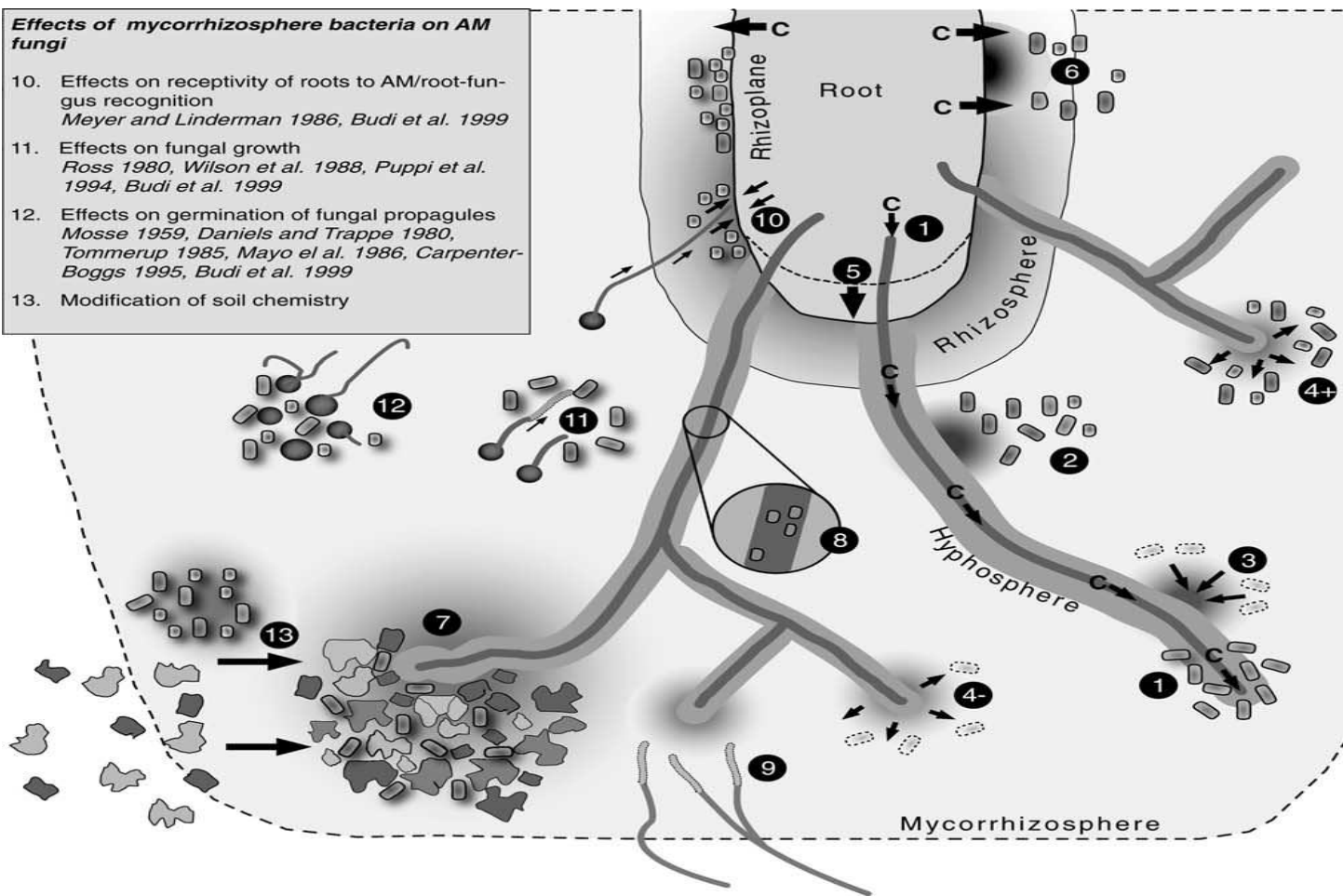
10. Effects on receptivity of roots to AM/root-fungus recognition  
*Meyer and Linderman 1986, Budi et al. 1999*
11. Effects on fungal growth  
*Ross 1980, Wilson et al. 1988, Puppi et al. 1994, Budi et al. 1999*
12. Effects on germination of fungal propagules  
*Mosse 1959, Daniels and Trappe 1980, Tommerup 1985, Mayo et al. 1986, Carpenter-Boggs 1995, Budi et al. 1999*
13. Modification of soil chemistry

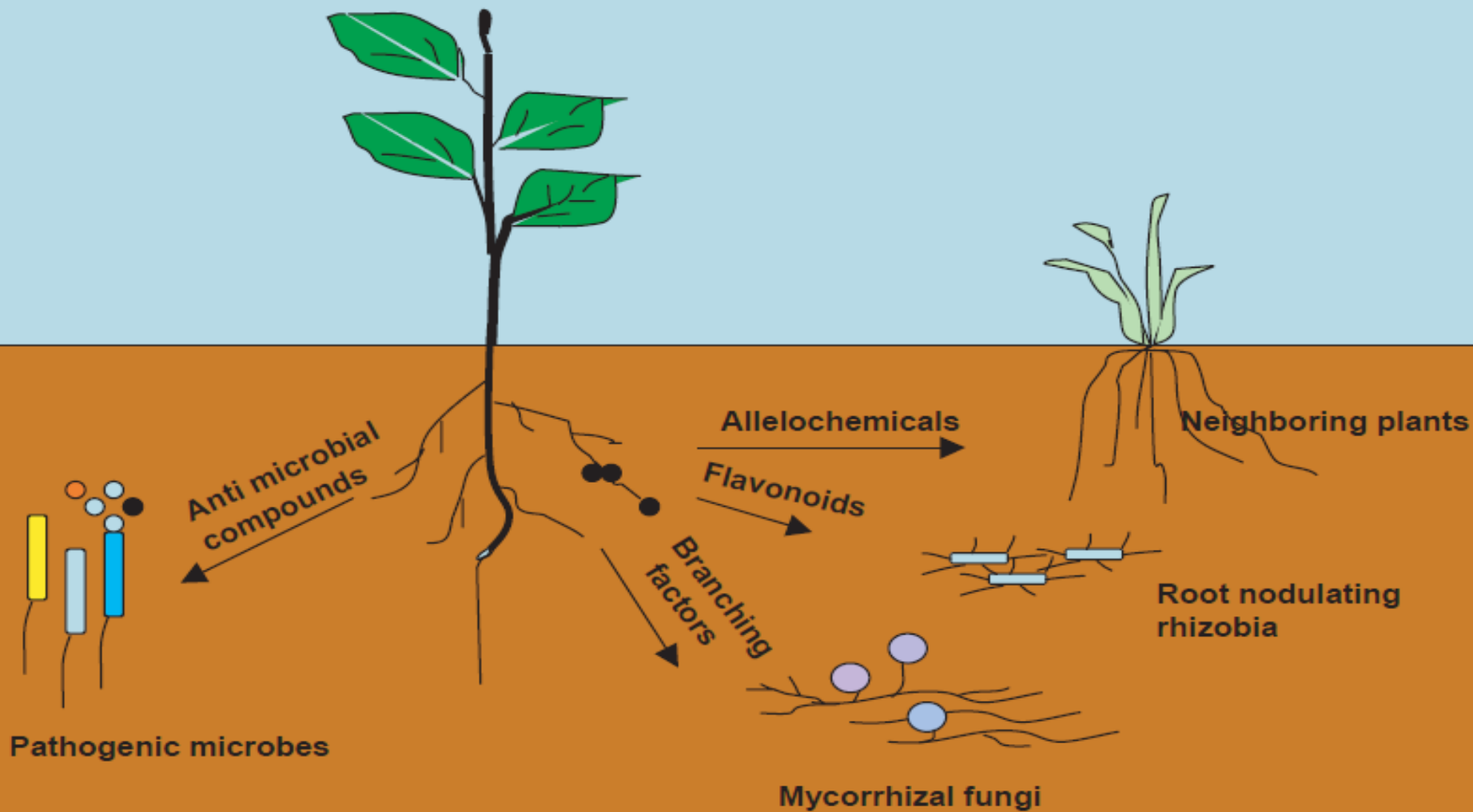
## Effects of AM fungi on mycorrhizosphere bacteria

1. Supply of energy-rich C compounds via hyphae  
*Andrade et al. 1997*
2. pH changes
3. Competition for nutrients  
*Ravnskov et al. 1999, Wamberg et al. 2003*
4. Other inhibitory (-) or stimulatory (+) compounds  
*Ames et al. 1984, Secilia and Bagyaraj 1987, Puppi et al. 1994, Filion et al. 1999*
5. Stimulated root growth
6. Changes in root exudation  
*Ravnskov et al. 1999, Söderberg et al. 2002*
7. Changes in soil structure  
*Tisdal and Oades 1979, Forster and Nicolson 1981, Shreiner et al. 1997, Andrade et al. 1998*

## Effects of AM fungi on endophytes and soil pathogens

8. Endophytic bacteria in AM fungal structures  
*Bianciotto et al. 1996, 2000*
9. Effects on pathogenic fungi  
*Newsham et al. 1995, Niemera et al. 1996, Citerinesi et al. 1996, St-Arnaud et al. 1997, Kapoor and Mukerji 1998, Filion et al. 1999*

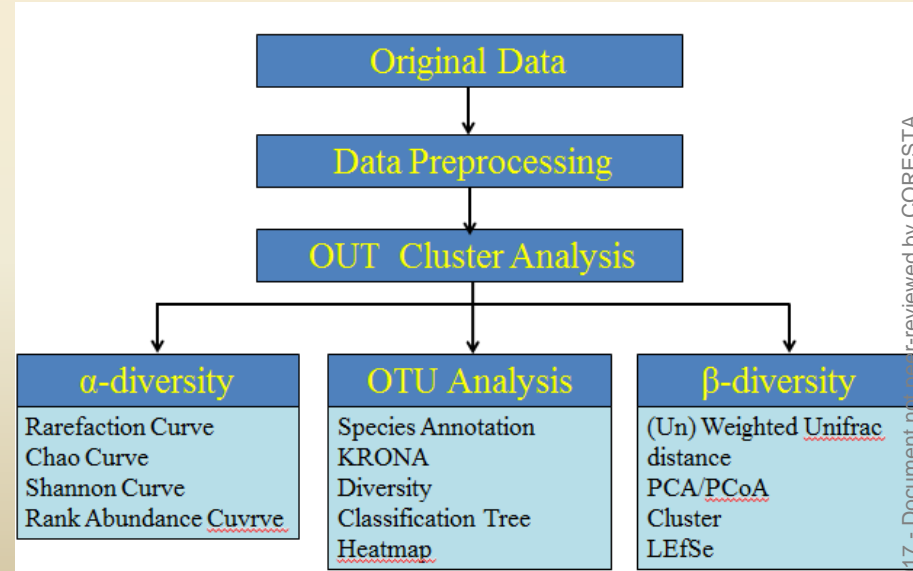
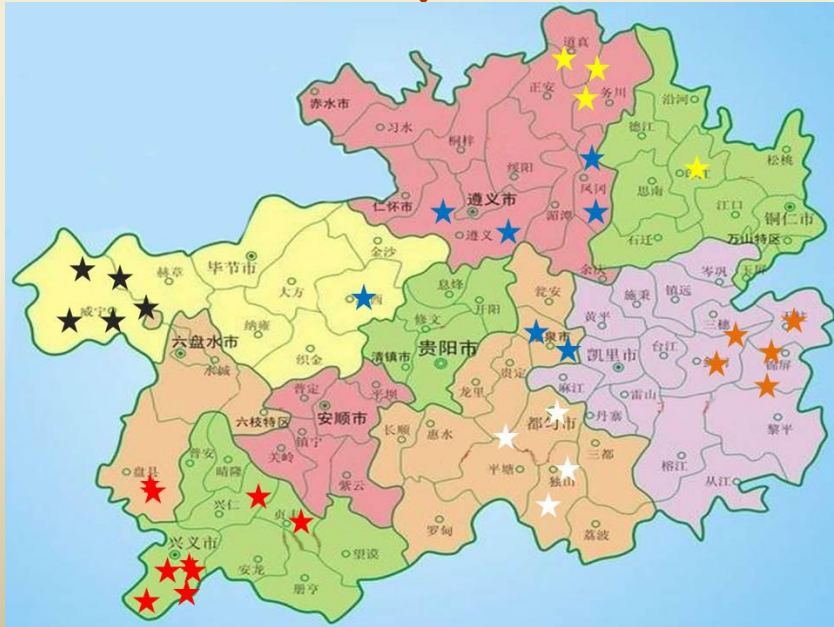


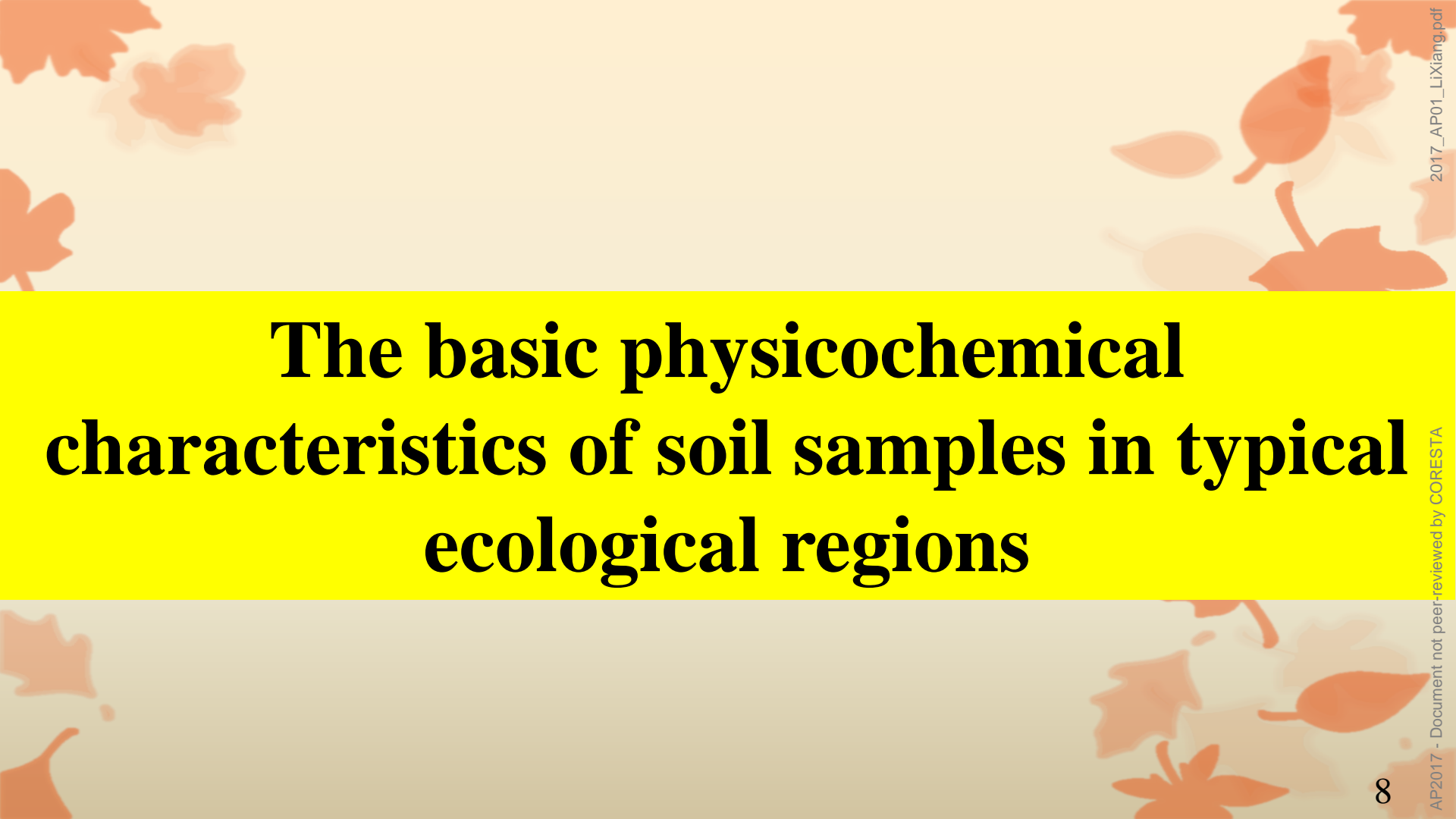


# Experimental Design

Collection of soils in different ecological regions

Soil microbial diversity analysis



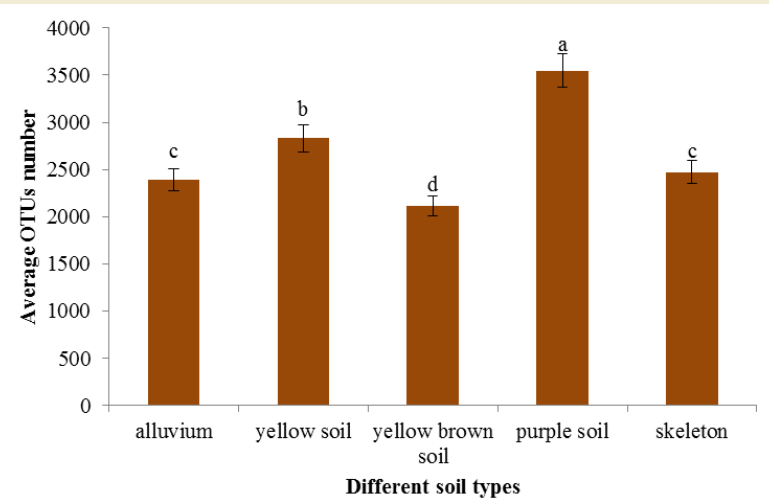
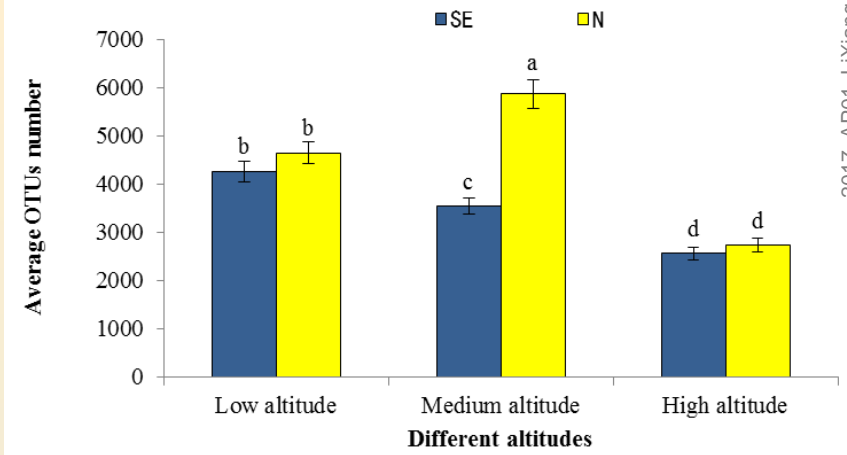
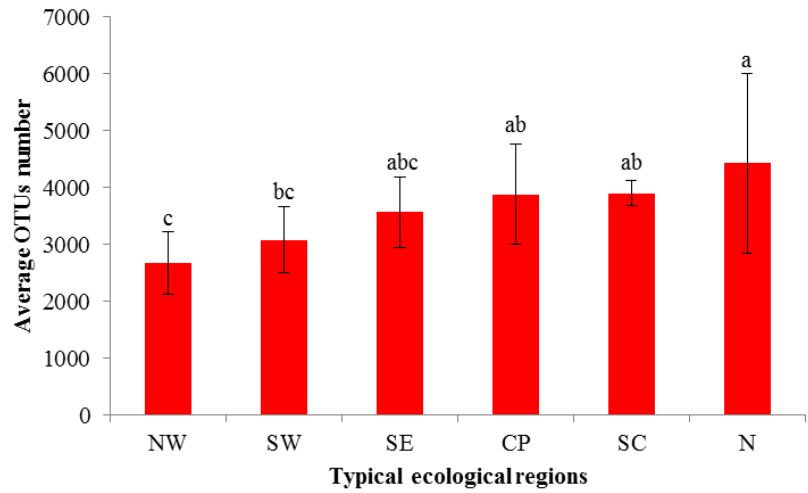


# **The basic physicochemical characteristics of soil samples in typical ecological regions**



Ecological regions	Sample code	pH	C%	N%	Organic matter%	Ecological regions	Sample code	pH	C%	N%	Organic matter%
Northwest Guizhou	WNCJT	6.72	3.04	0.29	5.30	South-centre Guizhou	DSSDT	5.11	2.11	0.22	3.67
	WNHR	6.72	3.00	0.29	5.23		DSHR	5.76	1.68	0.19	2.93
	WNHZR	6.56	3.69	0.34	6.43		DYSDT	6.28	1.80	0.20	3.14
	WNZT	4.93	1.85	0.18	3.23		DYHR	5.39	2.86	0.30	4.99
	XXCG	6.19	1.62	0.15	2.82		DZDHB	7.45	1.83	0.23	3.19
Southwest Guizhou	XYHR	6.30	2.22	0.19	3.86	North Guizhou	DZZHB	7.10	2.17	0.24	3.78
	XYHHR	5.80	2.73	0.24	4.76	DZGHB	5.98	2.68	0.24	4.67	
	XYHEI	4.90	2.57	0.22	4.47	FGHR	6.28	1.36	0.16	2.37	
	ZFZX	6.87	2.92	0.31	5.09	FGSDT	6.39	2.27	0.26	3.95	
	XRXZ	7.31	2.32	0.22	4.04	Centre part of Guizhou	ZYHR	6.56	1.11	0.14	1.94
	XYWS	5.89	2.29	0.27	3.99	ZYSDT	6.69	3.36	0.34	5.86	
	PXBT	6.14	1.76	0.20	3.07	QXHR	6.43	1.54	0.18	2.69	
Southeast Guizhou	TZ350	4.97	1.88	0.23	3.28	FQ1	5.05	2.17	0.26	3.78	
	TZ550	5.21	1.15	0.14	2.00	FQ2	5.38	2.03	0.23	3.54	
	TZ750	4.88	2.94	0.30	5.13						
	TZZT	5.26	1.47	0.17	2.56						
	TZSDT	5.32	3.03	0.27	5.28						

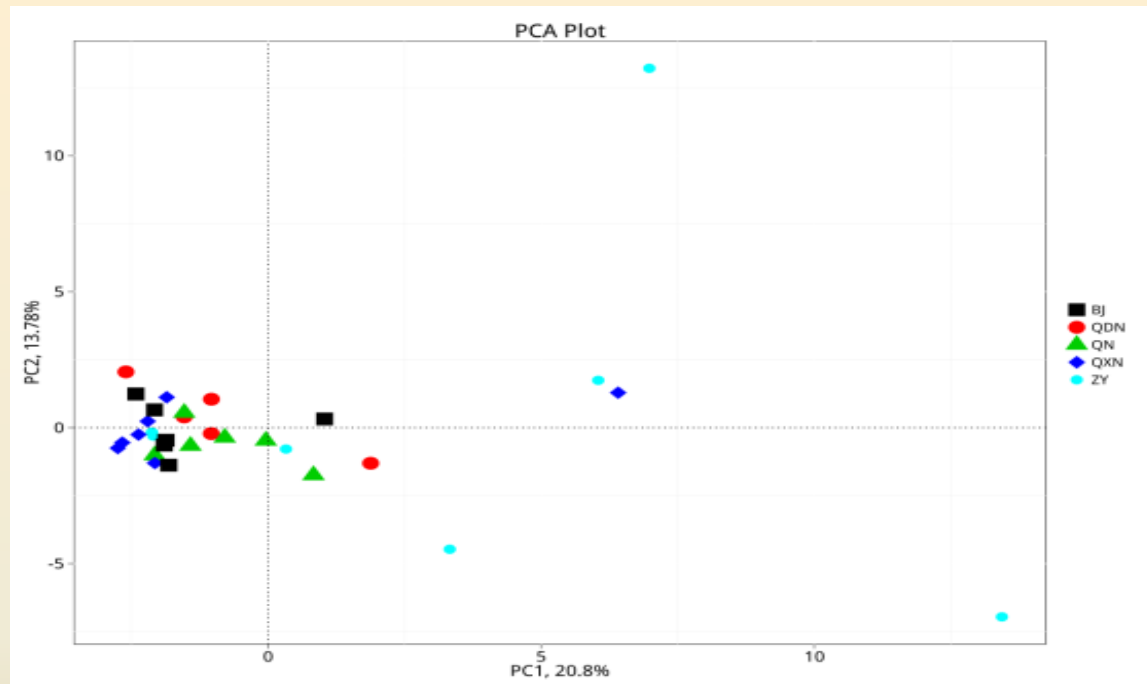
# OTU difference in ecological regions



OTU difference in typical ecological regions, altitudes and soil types.

# Soil microbial flora analysis





Principal component analysis (PCA) of beta diversity based on classification of the OTUs at a dissimilarity level of 0.03 for individual samples relative to ecological regions

# Summary and Perspective

# Summary and Conclusion

- ✓1、 The soil microbial investigation work is of great importance for tobacco planting, which supplies a great foundation of soil remediation.
- ✓2、 The soil microbial flora suggested potential pathogenic or unhealthy possibility.
- ✓3、 Soil microbial structure differs in different ecological regions, due to variable soil types, soil pH, nutrient contents, altitudes, and so on.
- ✓4、 Single factor could not decide soil microbial community. Soil microbial structure was caused by integrated factors.



# *Welcome to Colorful Guizhou!*

