record yield data. To facilitate feedback and sharing of information on the evaluation of cultivars, the members of TIP hold regular monthly meetings at various locations. These meetings help growers to learn about other growers' experiences. Participants are also asked to bring corms of cultivars ready to harvest for taste-test evaluations. Growers also provide information on cultivars that have been prepared for home consumption.

Farmers have been evaluating cultivars from the Philippines, Federated States of Micronesia, and Palau. Recently, the TIP farmers who have been evaluating these cultivars, were asked to rank them on a scale from 1 to 4 for characteristics of vigorous growth, yield, TLB resistance, sucker production, and eating quality. These preliminary results are shown in table 1.

Table 1. Taro Cultivar Rankings by TIP Farmers

Cultivar	No. of growers	Vigor	Yield	TLB Resistance	Suckers	Eating Quality
Fili	12	3.1	2.4	2.0	3.4	4.0
Pastora	11	3.8	3.3	2.9	3.2	1.6
Pwetepwet	10	3.4	2.9	2.7	3.8	2.2
Toantal	10	3.3	2.3	1.7	2.7	3.5
Palau 3	8	3.3	3.0	2.6	3.1	2.9
Palau 4	9	3.1	2.1	2.6	3.9	3.1
Palau 7	8	3.5	3.0	2.8	2.8	2.4
Palau 10	12	3.9	3.8	3.5	3.2	3.2
Palau 20	11	3.7	3.5	2.6	2.9	3.6
Niue now	8	1.9	2.0	1.1	1.9	1.9
Niue before TLB	10	3.9	3.9	—	3.1	4.0
Alafua Sunrise	2	2.7	2.5	1.7	1.0	2.7

Note: 1 = Unacceptable; 2 = Okay, but not good; 3 = Good; 4 = Outstanding.

TIP meetings provide an excellent forum for conducting participatory rural appraisals (PRAs) to elicit information regarding problems facing taro growers, the important criteria of an ideal taro cultivar, and farmers' perceptions of the cultivars that they are evaluating. TIP meetings also allow research staff to address those issues that farmers would like more information about, such as disease management and the processes involved in breeding. TIP meetings also help to facilitate the organization of taro diversity fairs and farmers' field days in Samoa.

Clone selection. So far, farmers have been mostly involved with evaluation and selection of introduced cultivars. As the program develops, it is intended that farmers will become more involved in the breeding program and participate in the selection of clones. This process is already underway. In September 1999, a cycle-2 population of taro seedlings was transferred from USP to a farmer's field in the village of Safa'atoa. A farmers' field day organized at this location helped to explain the

objectives of the breeding program currently underway in Samoa and how clones are selected from a seedling population. Farmers had the opportunity to observe firsthand the preliminary selections made by USP researchers. These preliminary selections totaled almost 200 clones. Duplicates (suckers) of these selections have been given to three farmers for evaluation on their own farms. The farmers as a group have also helped in narrowing the preliminary clones from 200 to the final 25 selections by participating in taste and quality tests during TIP monthly meetings. These 25 clones (table 2) are being multiplied for on-farm evaluation by TIP farmers later this year.

Table 2. Average Leaf Number, Months to Harvest, Yield, and Taste of the Top 25 Taro Clones Selected from a Cycle-2 Population in Samoa

Clone Number	Months to Harvest	Yield (kg)[1]	Average Leaf Number	Taste[2]
C2-30	5	1.0	6	3.5
C2-40	6	1.1	7	3.6
C2-47	6	0.7	5	3.5
C2-48A	6	0.8	5	3.6
C2-70	6	0.7	4	3.5
C2-77	6	0.7	5	3.7
C2-93A	5	0.9	5	3.6
C2-94	5	0.8	5	3.6
C2-97	6	0.7	6	3.7
C2-132	6	0.6	5	3.5
C2-144	6	1.1	5	3.8
C2-145	6	0.6	4	3.6
C2-147	6	0.6	5	3.6
C2-148	6	0.6	4	3.7
C2-152	5	0.8	5	3.8
C2-157	6	0.6	5	3.6
C2-160	5	0.6	5	3.8
C2-161	6	—	6	3.6
C2-194	6	1.1	7	3.9
C2-196	6	0.9	7	3.5
C2-227	5	0.6	7	3.6
C2-232	6	0.7	6	3.8
C2-234	6	0.9	6	3.7
C2-234A	6	0.8	5	3.8
C2-236A	6	0.7	7	3.5

1. Based on weight of single corm at harvest.
2. Evaluated as 1 = poor, 2 = OK, 3 = good, 4 = excellent.

University Taro-Breeders' Club

A university taro-breeding club was initiated at USP in 1999. The first university breeding club in the world was started in 1995 in Mexico. We believe that the club at USP is the first to be inaugurated outside of Latin America. The club represents an innovative approach to teaching and learning at USP. It is a cheap and easy approach to breeding. It ensures that there are many hands to do breeding work and has resulted in increased taro breeding activity. Robinson (1996, 1997) has proposed university breeding clubs as a "hands-on" approach for students to learn about breeding for horizontal resistance and a way of "scaling-up" farmer participation in plant breeding (see box 1). Robinson (1997) envisaged student-members of breeding clubs returning to their family farms with potential new cultivars for evaluation. After a few decades, there could be hundreds, or even thousands, of former club members testing new lines as they emerge from clubs. Additional breeding clubs would increase the output even more, providing the *widest extent and the highest possible quality of farmer participation in plant breeding.*

Box 1. Aspects of Breeding Clubs That Promote Student and Farmer Involvement and a "Scaling-Up" of Participatory Plant-Breeding Activity

- Clubs would provide a new "hands-on" approach to plant breeding in an effective group-learning context for students.
- Clubs could transfer plant-breeding skills to many amateur breeders working within a single agroecosystem involving a few thousand farmers.
- There would be a vast increase in breeding skills as graduates return to their villages and initiate local farmers' or amateur breeding clubs.
- Hundreds of plant breeding clubs worldwide could significantly improve crops by a huge increase in breeding activity.
- Clubs would re-establish links between researchers and farmers. High levels of farmer participation in plant breeding would result when farmers' children join university breeding clubs.

Source: Robinson (1997).

The overall aim of the USP taro breeding club is to produce high-yielding, good-quality taro cultivars that have high levels of horizontal resistance to TLB and other locally important taro pests, and that are adapted to a range of diverse environments. At the same time, the club allows students to learn about the breeding process in a practical way. The club is seen as an integral component of TIP, using selected farmers for evaluation of clones and multiplication of potential new cultivars. The club has a formal structure with elected officers, including a president, vice-president, treasurer, and secretary. A club constitution was drawn up and it is run along the lines of a student organization. Most members are students but some are professionals, such as lecturers, crop researchers, technicians, and university administrators, while a small percentage are farmers.

The club meets regularly at the University's Alafua Campus. This campus is the location for the club's breeding blocks and it is on-campus that most crossing takes place and where taro seedlings are raised. Screening and evaluation of seedling populations take place at locations with suitable disease pressure. To date, duplicate breeding blocks have been initiated on-campus. One block is for the use of researchers and the other for the use of students. The student breeding block is made available solely for the use of students, and they are encouraged to maintain their own subplot, make crosses within this, harvest seed, and raise seedlings for field evaluation. The committee decides on a program of topics and field visits to facilitate learning about plant breeding with

assistance from university technical staff. The club is self-financed largely through the payment of member fees and fund-raising events.

Conclusions

Although TIP is a young organization, it is already showing that farmers can evaluate many different taro cultivars and select those they prefer. The membership of the program has expanded rapidly in its first year. The program has improved dialogue between researchers, extension staff, and farmers. Evaluation of cultivars is still underway and a considerable amount of quantitative and qualitative data have been compiled. This will be analyzed shortly. There are early indications that growers are selecting a range of cultivars. Taro *Fili* has been included as the preferred resistant cultivar to date. It is interesting to note that some growers are showing preferences for cultivars (*Toantal*, *Pwetepwet*, *Pastora*) that were evaluated by MAFFM at the same time as taro *Fili* but which were not recommended or widely promoted. Both *Pwetepwet* and *Pastora* were previously believed to be of poor quality, although they both have good levels of resistance to TLB and they are both high yielding. One farmer has observed that the quality improves if harvest is delayed for a few months. The same farmer has also reported that he likes *Pastora* despite its tendency to be *susu* (meaning wet, a quality not liked by Samoans). He removes the top (wet) half and uses the bottom part of this high-yielding cultivar.

There has been considerable confusion in Samoa about Palau cultivars. This has arisen as a result of unauthorized imports of batches of mixed cultivars from nearby American Samoa. There are 12 different cultivars from Palau in Samoa. Some are good quality and some are considered wet. TIP has been working to address this confusion, and gradually those cultivars of good quality are being identified. Early indications are that growers prefer Palau 20 and 10. Reports from American Samoa show that both Palau 20 and 10 are most preferred by growers there. Many of the growers have experimented with the harvest date of the Palau cultivars and report that this can significantly influence the corm quality. These findings are important. Some Palau cultivars are found to be wet if harvested early (five to six months), but this can be overcome, in some cases, by delaying harvest until seven to eight months. Research station evaluations of taro usually occur after six months.

As a result of the impact of TIP on Upulo, MAFFM have initiated a similar TIP program on the other main island of Savai'i. In May 2000, nine extension officers from Savaii spent time on Upulo visiting farmers involved with TIP and took part in the May monthly meeting to observe how the club operated. This should ensure that farmers on that island get quicker access to a range of resistant taros.

There are some aspects of the USP taro-breeders' club that make it different from other clubs like the one at the *Universidad Autonoma de Chapingo* in Mexico. The University of the South Pacific is a regional university, whereas the *Universidad* is a national university. USP draws a student body from over 12 individual countries dispersed in the Pacific Ocean. This poses one problem for a university breeders' club but it also has an advantage. Robinson (1997) highlights the positive interaction that may arise between a breeding club and farmer participation schemes. In the *Universidad* situation, students come from surrounding villages. Students can return to these villages with the progeny of the crosses they have made and carry out participatory selection with farmers on family farms. Certain selections may become potential cultivars but can also be fed back into the breeding club system to become future parents. Unfortunately, the majority of student members of the taro-breeding club come from countries other than Samoa and quarantine and unresolved owner-

ship issues preclude taro germplasm leaving Samoa for evaluation on many family farms. The solution to this problem is to pool all crosses together and evaluate seedlings as one population through the TIP program. The advantage of having members from many different countries is the high potential for similar breeding clubs to be initiated elsewhere when students return to their home countries at the completion of studies. The club also plans a regular newsletter to maintain contact with members who have finished their studies.

The breeders' club has been successful as an innovative "hands-on" approach to teaching and learning, but club activities place considerable demands on student time. A three-year degree means that students have a packed timetable that allows little time for "extracurricular" activities. One possible solution to this problem is a cross-credit system to the conventional degree-level breeding courses that are taught at USP. This would allow students to obtain cross-credits for the breeding activities that they carry out as part of the breeders' club. Likewise, lecturers would also accrue teaching credits for their involvement in the breeders' club.

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